TAXONOMIC REVISION OF *GOUANIA* (RHAMNACEAE) FOR NORTH AMERICA[1]

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Abstract

Taxonomic revision of *Gouania* Jacq. (Rhamnaceae) is presented for the full extent of its range in North America, from Florida and Mexico through Central America to and including Panama, and the islands of the Caribbean region, including the Bahamas. Fifteen species are recognized, five of which are described and published as new: *G. croatii* A. Pool (Panama and Colombia), *G. ferruginea* A. Pool (Guatemala and Honduras), *G. guiengolensis* A. Pool (Oaxaca, Mexico), *G. obamana* A. Pool (Mexico, Guatemala, Belize, and Honduras), and *G. pubidisca* A. Pool (Mexico, Guatemala, El Salvador, and Nicaragua). Lectotypes are designated for *Banisteria lupuloides* L. [≡ *G. lupuloides* (L.) Urb.] (and the synonymous *G. domingensis* L.), *G. colombiana* Suess., *G. glabriuscula* Stokes, *G. lupuloides* var. *aptera* Urb., *G. mexicana* Sessé & Moc., *G. mexicana* Rose [≡ *G. rosei* Wiggins], *G. paniculata* Spreng., *G. pubescens* Poir. var. *martinicensis* Poir., *G. pubescens* var. *pubescens*, *G. virgata* Reissek var. *virgata* [≡ *G. virgata* var. *guianensis* Reissek], *G. virgata* var. *brasiliensis* Reissek, and *Rhamnus polygama* Jacq. [≡ *G. polygama* (Jacq.) Urb.] (and the synonymous *G. tomentosa* Jacq.). Epitypes are designated for *B. lupuloides* L. [≡ *G. lupuloides*] (and the synonymous *G. domingensis* L.), *G. stipularis* DC., and *R. polygama* Jacq. [≡ *G. polygama*] (and the synonymous *G. tomentosa*). A neotype is selected for *R. domingensis* Jacq. and a lectotype is designated for the equivalent name *G. glabra* Jacq.

Resumen

Se presenta una revisión taxonómica de *Gouania* Jacq. (Rhamnaceae) en toda su extensión en América del Norte, desde Florida y México a través de América Central hasta e incluyendo Panamá, y las islas del Caribe incluyendo las Bahamas. Se reconocen 15 especies, cinco de las cuales se describen y publican como nuevas: *G. croatii* A. Pool (Panamá y Colombia), *G. ferruginea* A. Pool (Guatemala y Honduras), *G. guiengolensis* A. Pool (Oaxaca, México), *G. obamana* A. Pool (México, Guatemala, Belice y Honduras) y *G. pubidisca* A. Pool (México, Guatemala, El Salvador y Nicaragua). Se designan lectotipos para *Banisteria lupuloides* L. [≡ *G. lupuloides* (L.) Urb.] (y la sinónima *G. domingensis* L.), *G. colombiana* Suess., *G. glabriuscula* Stokes, *G. lupuloides* var. *aptera* Urb., *G. mexicana* Sessé & Moc., *G. mexicana* Rose [≡ *G. rosei* Wiggins], *G. paniculata* Spreng., *G. pubescens* Poir. var. *martinicensis* Poir., *G. pubescens* var. *pubescens*, *G. virgata* Reissek var. *virgata* [≡ *G. virgata* var. *guianensis* Reissek], *G. virgata* Reissek var. *brasiliensis* Reissek y *Rhamnus polygama* Jacq. [≡ *G. polygama* (Jacq.) Urb.] (y la sinónima *G. tomentosa* Jacq.). Se designan epitipos para *B. lupuloides* L. [≡ *G. lupuloides* (L.) Urb.] (y la sinónima *G. domingensis* L.), *G. stipularis* DC. y *R. polygama* Jacq. [≡ *G. polygama*] (y la sinónima *G. tomentosa*). Se selecciona un neotipo para *R. domingensis* Jacq. y se designa un lectotipo para el nombre equivalente *G. glabra* Jacq.

Key words: Bahamas, Caribbean, Central America, Florida, *Gouania*, IUCN Red List, Mexico, Neotropical Dry Forest, North America, Rhamnaceae, *Rhamnus*, Trinidad and Tobago.

Gouania Jacq. is a pantropical genus of approximately 50 species in the Rhamnaceae, a family of 52 genera and ca. 925 species (Medan & Schirarend, 2004). It can be distinguished from other Rhamnaceae by its tendriled lianescent habit and 3-winged dry schizocarps that separate into three 2-winged indehiscent mericarps (Medan & Schirarend, 2004). The genus was established by Jacquin in 1763 with two species from Haiti ("Domingensibus"), *G. tomentosa* Jacq. (previously published as *Rhamnus polygama* Jacq.; see *G. polygama* (Jacq.) Urb.) and *G. glabra* Jacq. (previously published as *R. domingensis* Jacq.; see *G. lupuloides* (L.) Urb.). *Gouania tomentosa* is indicated as the type species by Jacquin including the explanation of the derivation of the genus name (named for Antoine Goüan, 1733–1821, French botanist and medical doctor) in the description of *G. tomentosa* (Jacquin, 1763). The genus name was quickly adopted by other botanists, with Linnaeus in the same year (1763) publishing *G. domingensis* L., based on the same elements as his earlier (1753) published name, *Banisteria lupuloides* L. (see *G. lupuloides* (L.) Urb.).

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A number of names in *Gouania* were published subsequently over the next two centuries for taxa in North America, but no serious attempt was made to revise the North American species. Most North American floristic accounts (Standley, 1923; Standley & Steyermark, 1949; Liogier, 1953b; Fernández, 1986, 1996; Johnston, 2001; Acevedo-Rodríguez, 2003) have relied heavily on the degree of leaf pubescence, which has proved to be a very unreliable character. However, Reissek (1861), who provided a very detailed account for the South American species, recognized the importance of floral disc pubescence and the relative length of disc lobe to sepal length, using these characters to divide the species treated into three unnamed series: series I, with the floral disc entirely covered with trichomes; series II, with the trichomes of the floral disc restricted to the annulus; and series III, with the floral disc glabrous. Series III was subdivided into two subseries: IIIa, with disc lobes one half the length of the sepals; and IIIb, with disc lobes one fourth to one third the length of the sepals. Reissek (1861) also included stipules in his species descriptions and appears to be the first author to recognize that the stipules in some species are lobed (or semihastate in his terminology). Bornstein (1989) followed Reissek (1861) in using pubescence of the floral disc as an important character and added the shape of the mericarps to help separate the two species (*G. lupuloides* and *G. polygama*) found in the Lesser Antilles. Subsequently, two other publications (Liogier, 1994; Krings & Braham, 2005) also used these characteristics to separate *G. lupuloides* and *G. polygama*.

Morphology

Morphological characters are discussed below, and the most diagnostic of these are used in the comparison of *Gouania* species in Table 1.

BRANCHES

Bornstein (1989) found the degree of pubescence of the young branches to be helpful in separating *Gouania lupuloides* and *G. polygama* in the Lesser Antilles, but not in other geographic areas. I found young branch pubescence to be quite variable in degree and type for most species of *Gouania*. Exceptions to this are *G. colombiana* Suess. (puberulent to glabrous), *G. stipularis* DC. (glabrous), and *G. croatii* A. Pool, *G. ferruginea* A. Pool, and *G. velutina* Reissek (these three, densely villous or velutinous). A couple of species (*G. eurycarpa* Standl. and *G. obamana* A. Pool) have hollow young branches, but this is variable in a number of other species and might prove to be variable in these species as well.

LEAF BLADES

I found the most useful leaf character to be the number of lateral veins that lie on either side of the blade midrib. One side of the leaf often has one more lateral vein than the other; in this revision I have always used the higher number. The number of lateral veins per side of the midrib range from (two)three or four(five) in *Gouania hypoglauca* Standl. and three to five in *G. obamana* to (six)seven or eight(nine) in *G. croatii* and *G. polygama*, and seven or eight in *G. ferruginea* (see Table 1).

Another frequently useful leaf character is that the abaxial surface may dry lighter than the adaxial one. This difference is markedly so in *Gouania croatii*, *G. ferruginea*, *G. obamana*, *G. pubidisca* A. Pool, and *G. velutina*, and can be usually observed in *G. ekmanii* Alain, *G. hypoglauca*, and *G. polygama*. The leaves of *G. lupuloides*, *G. colombiana*, and *G. guiengolensis* A. Pool vary from markedly bicolored to unicolored.

In North America, the leaves of *Gouania* are nearly always distinctly toothed, and the teeth bear apical glands. The glands at the junction of the blade with the petiole are often elaborate and long-stipitate or sometimes borne on foliaceous appendages. These glands are extremely variable and were not found to be helpful in identifying species. The type and number of marginal teeth were also found to be too variable within a species to be helpful. I have tried to differentiate types of marginal tooth glands, but they are all very similar and not distinctive in North American specimens. This is not the case in South America, where some species, such as *G. trichodonta* Reissek and *G. riparia* Reissek, have the glands adorned with a tuft of trichomes while others, such as *G. alnifolia* Reissek, have very large and open glands.

Historically, the amount of leaf pubescence has been widely used to separate species of *Gouania*. I found both the type and quantity of leaf pubescence to be too variable in most species to be diagnostic. There are a few exceptions: *G. ekmanii* and *G. hypoglauca* have the abaxial blade surface densely covered between the veins with straight and tightly appressed trichomes 0.05–0.2 mm long. *Gouania colombiana* has the trichomes of the abaxial surface differentially retained mainly at the apex, but its leaves are otherwise nearly glabrous. The leaves of *G. stipularis* are always glabrous (or with trichomes restricted to the major venation), and those of *G. obamana* are also almost glabrous, with trichomes on the veins and in the axils of the lateral veins with the

Table 1. Comparison of North American Species of *Gouania*.

Morphological characters	*G. colombiana*	*G. conzattii*	*G. croatii*	*G. ekmanii*	*G. eurycarpa*	*G. ferruginea*	*G. guiengolensis*	*G. hypoglauca*	*G. lupuloides*	*G. obamana*	*G. polygama*	*G. pubidisca*	*G. rosei*	*G. stipularis*	*G. velutina*
Lateral veins per side	(4)5(6)	(5)6 to 8	(6)7 or 8(9)	5 or 6	4 or 5(6)	7 or 8	4 to 6	(2)3 or 4(5)	(3)4 or 5(6)	3 to 5	(6)7 or 8(9)	5 or 6 (7)	(4)5 to 7	(5)6(7)	5 to 7
Stipule lobes	1 or 2	2	2	2	2	2	1	1(2)	2	2	2	1(2)	1(2)	3	2
Shape of upper stipule lobe	ovate or reniform	lanceolate, acuminate	lanceolate, acuminate	lanceolate, acuminate	lanceolate, acuminate	lanceolate, acuminate	linear	triangular, acuminate	lanceolate, acuminate, or triangular	lanceolate, acuminate	lanceolate, acuminate	ovate, acute	lanceolate, acuminate	reniform	lanceolate, acuminate
Foliaceous lower stipule lobe	no	no	yes	no	no	no	no	no	variable	no	no	no	no	yes	yes
Pedicel length (mm)	1.25–2.5	0(−1)	0–0.5	1.25	0.75–2	0–0.75	0–1	0–0.25 (0.75)	(0.5)1–3 (−4)	0–1.5	0–1.5 (−2.5)	0–0.5	0–0.5 (0.75)	2–3.5	0–0.75
Disc lobe length relative to sepal length	3/4–1/1	1/4–1/3 (−1/2)	(1/3–) 1/2	1/3	1/4–1/3	(1/5–) 1/4	1/4–1/3 (−1/2)	1/6–1/3	1/5–2/5 (−1/2)	1/4–1/3 (1/2)	(1/3–)2/5–3/5 (−2/3)	1/5–1/3	1/3–2/5 (1/2)	1/10–1/4	(1/2–) 2/3–1/1
Disc surface pubescence	no	no	no	no	no	no	no	yes	no	no	no	yes	no	no	no
Disc annulus pubescence	no	variable	yes	yes	no	no	yes	yes	no	yes	yes	yes	variable	no	variable
Mericarp shape	butterfly	butterfly	dumbbell	butterfly	butterfly	butterfly	butterfly	butterfly	butterfly	dumbbell	dumbbell	butterfly	butterfly	butterfly	butterfly
Mericarp pubescence	no	no	yes	yes	yes	yes	no	yes	no	yes	no	yes	yes	no	yes
Fruit body height (mm)	6–10	5–6	3–4	4–5	(5) 6–9	6.2	5–6	6–12	4–7	4–6	(2.5–) 3–4	4–7	4–5	4–6	4–6
Mericarp wing height (mm)	11–13	7–10	6–7	6	(6) 8–11	7.2	6–7.5	9–14	(5) 6.6–12	(9–) 10–14	(4–) 5–8 (−9)	7–10	4–6	5–7	6–9
Mericarp width (mm)	10–17	12–15	12–15	8–9	11–15	12	7–8	10–15.3 (17)	(8) 9–16	14–20	(7–) 9–17	10–14	6–9	6–11	8–10 (11)
Fruit body width relative to mericarp width	1/6–1/4	1/3	1/6–1/4	1/4–1/3	1/4–1/3	2/5	3/5	1/4–1/2	(1/5) 1/4–1/2	1/5–1/4 (−1/3)	1/6–1/4 (−1/3)	1/5–1/3	(1/3) 1/2	1/3–1/2	1/4–1/3
Mericarp width relative to fruit body height	1.2–2.2	2–3	3–3.5	2	1.5–2	2	1–1.5	1.5–2	1.5–3.2	2.75–4	3–4(−5)	2–2.5	1.25–2	1–2	1.5–2 (−2.5)
Seed length (mm)	4	3.5–3.75	2–2.2	2.3–2.75	3–3.75	unknown	3.5–4	3.25–4.5	2.7–3.8	3.5	(1.8–) 2.2–2.75	2.5–3.25	2.5–3.5	3.1–3.5	2.25–2.5(3.3)

midrib. Abaxial leaf surfaces are always densely villous or tomentose in *G. croatii* and *G. ferruginea* and densely pilose to tomentose in *G. pubidisca* and *G. velutina*.

STIPULES

The stipules of Rhamnaceae are usually described as small (Medan & Schirarend, 2004) or small and generally deciduous (Standley & Steyermark, 1949; Nowicke, 1971) and have been largely ignored. However, the stipules of *Gouania* provide many useful characters (Table 1, Fig. 1). Most species of *Gouania* in North America have two well-developed stipule lobes, the upper lobe in most cases being lanceolate and acuminate (or sometimes triangular in *G. lupuloides*); however, one species, *G. stipularis*, has three well-developed stipule lobes, the two lateral lobes being foliaceous and reniform to orbicular and the mid-lobe lanceolate (Fig. 1H), and another species, *G. guiengolensis*, has unlobed linear stipules (Fig. 1B). *Gouania colombiana*, *G. hypoglauca*, *G. pubidisca*, and *G. rosei* Wiggins usually have only the upper stipule lobe developed (ovate to reniform in *G. colombiana* [Fig. 1A], triangular and acuminate in *G. hypoglauca*, ovate and acute in *G. pubidisca*, lanceolate and acuminate in *G. rosei*), but their stipules may at times also have a minute lower lobe. The lower stipule lobe is consistently foliaceous only in *G. croatii* (Fig. 9B), *G. stipularis*, and *G. velutina* (Fig. 1I), but can vary in *G. lupuloides* from subulate and 0.1 mm long to foliaceous and 14 mm long (Fig. 1C–G). The persistence of the stipules is also a good species-level character. They can be retained (usually) into or through fruiting in some species (*G. colombiana*, *G. ekmanii*, *G. eurycarpa*, *G. ferruginea*, *G. lupuloides*, *G. stipularis*, and *G. velutina*), or are lost in anthesis (*G. conzattii* Greenm., *G. croatii*, *G. guiengolensis*, *G. hypoglauca*, *G. pubidisca*, and *G. rosei*) or, in some species (*G. obamana* and *G. polygama*), before the leaves expand.

FLOWERS

All of the species of *Gouania* in North America have small (sepals 0.6–1.3 mm long) greenish yellow to greenish white flowers. The petals are all slightly smaller to equivalent to the sepals in length. The most diagnostic characters of the flowers (Table 1) are the relative pubescence of the floral disc, with the trichomes covering the whole disc excluding the lobes (series I of Reissek, 1861); with the trichomes along the annulus of the disc, through which the style protrudes at maturity (series II of Reissek, 1861); or with the disc totally glabrous (series III of Reissek, 1861). The length of the disc lobes, relative to the length of the sepals, distinguished subseries IIIa and IIIb for Reissek (1861). While these characters are useful, they must be used with caution. In North America, there are two species that usually have the entire nonlobed portion of the disc pubescent (*G. hypoglauca* and *G. pubidisca*, Fig. 13B), but sometimes have trichomes only around the annulus (at times with rays extending onto the disc proper). Some species have the annulus and only the annulus with trichomes (*G. croatii*, Fig. 9D; *G. ekmanii*, *G. guiengolensis*, Fig. 11C; *G. obamana*, Fig. 12C; and *G. polygama*), while other species may have the annulus pubescent or not (*G. conzattii*, *G. rosei*, and *G. velutina*). The length of the disc lobes relative to the length of the sepals varies from one tenth in *G. stipularis* to being equivalent in *G. colombiana* and *G. velutina*. The relative pubescence of the discs is observable even in very young, pried-open buds and, along with the relative disc lobe/sepal length, can also usually be observed in fruit. Pedicel length is a problematic character because in most of the species, the pedicels expand as the flowers mature.

MERICARPS

The fruits of *Gouania* consist of three 2-winged mericarps that separate at maturity (Fig. 2A–N). The relative shape of the mericarps, as well as their dimensions, external pubescence (Table 1), and coloration patterns on the inner surface, are all diagnostic characters. In North America, the mericarps are two basic shapes. What I refer to as dumbbell-shaped mericarps are transversely oblong with a very broad sinus at the apex and base of the fruit body (Fig. 2C, J) or only at the apex in *G. obamana* (Fig. 2I). The fruit body itself is like the central bar or handhold of a dumbbell. Bornstein (1989: 165) described this fruit shape as "fruit wing attached to side of fruit body only," and I borrow his description. This is not technically accurate, as a thin margin of the wing continues along the apex and base of the fruit body, but it does help to explain the shape. What I term as butterfly-shaped mericarps are more or less circular to transversely oblong, with emarginations to deep clefts at the apex and base of the fruit body (Fig. 2A, B, D–H, K–M) or emargination only at the base in *G. velutina* (Fig. 2N). Bornstein (1989: 165) described this type as "fruit wing attached to side and base, and/or apex of fruit body," and I again borrow from him. For the mericarps of each species, I give measurements for the height of the fruit body (i.e., the middle part containing the seed), the height of the wings, the

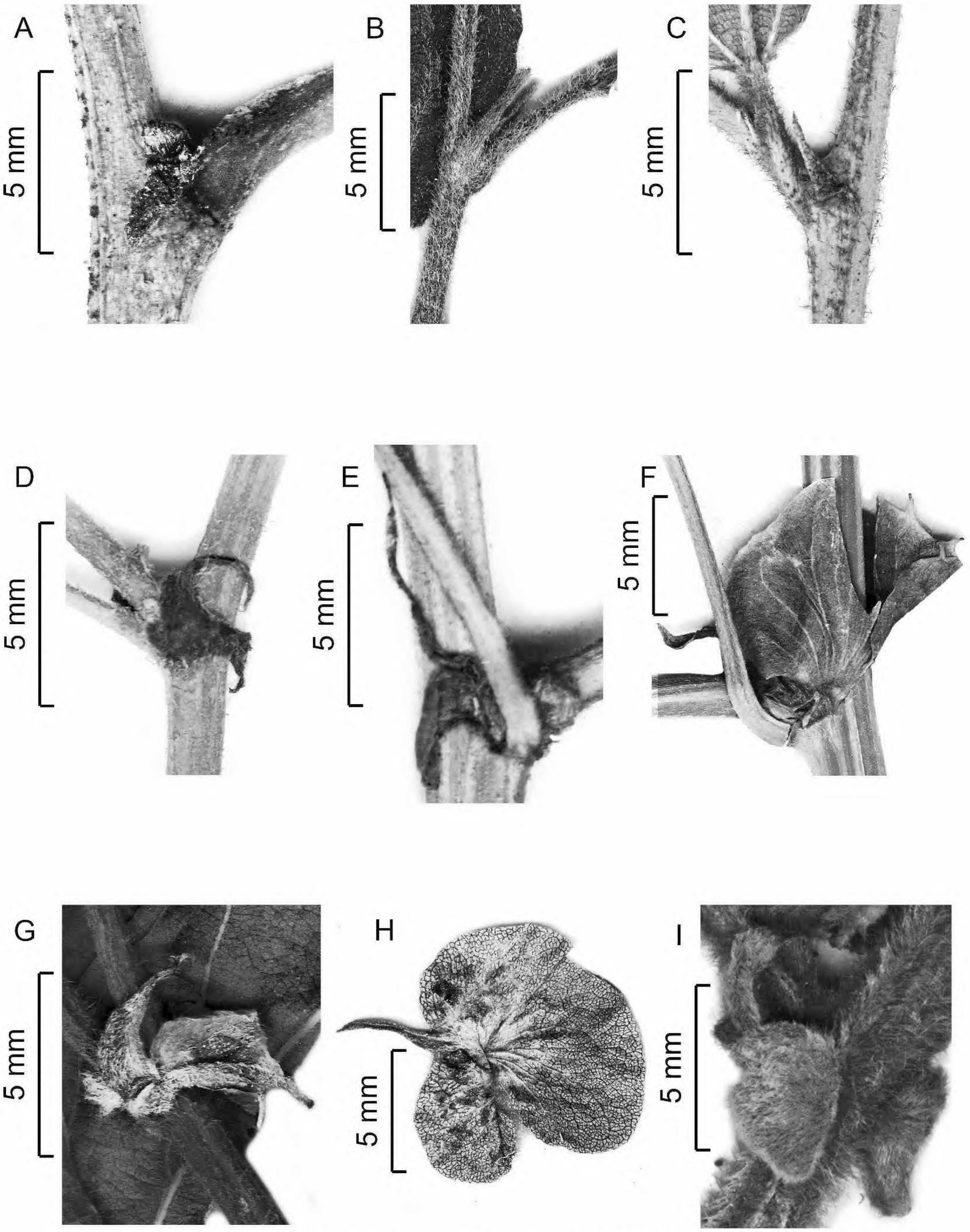


Figure 1. Stem nodes with stipules of selected species of *Gouania*. —A. Unlobed, ovate stipule of *G. colombiana* Suess., scanned from *J. A. González et al. 1640* (MO). —B. Unlobed, linear stipule of *G. guiengolensis* A. Pool, scanned from the paratype *E. Matuda 586* (MO). C–G. Variability in bilobed stipules of *G. lupuloides* (L.) Urb. —C. Stipule with upper lobe triangular, acuminate, firm and lower lobe subulate in *G. lupuloides*, scanned from *D. E. Breedlove & G. Davidse 54431* (MO). —D. Stipule with upper lobe lanceolate, acuminate and the tip long extended and flexuous and lower lobe lanceolate and acuminate in *G. lupuloides*, scanned from *E. F. Cabrera C. & H. de Cabrera 9460* (MO). —E. Stipule with upper lobe lanceolate, acuminate and the tip long extended and flexuous and lower lobe foliaceous and ovate without teeth in *G lupuloides*, scanned from *H. S. Gentry 4949* (MO). —F. Stipule with upper lobe lanceolate, acuminate and the tip long extended and flexuous and lower lobe foliaceous and reniform with three short glandular teeth in *G. lupuloides*, scanned from *J. I. Calzada 1684* (MEXU). —G. Stipule with upper lobe lanceolate, acuminate and the tip long extended and flexuous and lower lobe foliaceous and ovate with three long-extended glandular teeth in *G. lupuloides*, scanned from *R. Torres C. et al. 3560* (MO). —H. Stipule with three well-developed lobes of *G. stipularis* DC., scanned from *O. Téllez V. & F. Chiang C. 9718* (MO). —I. Bilobed stipule, with the lower lobe foliaceous and cucullate of *G. velutina* Reissek, scanned from *E. López 82* (MO).

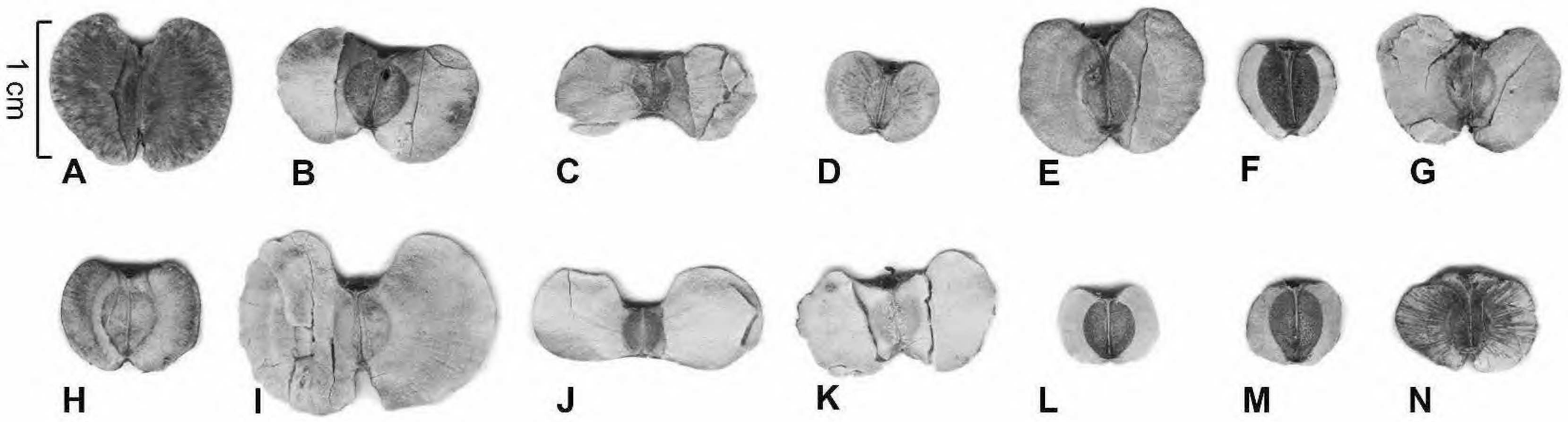


Figure 2. Inner surfaces of mericarps of North American *Gouania* Jacq. (excluding *G. ferruginea* A. Pool). —A. *Gouania colombiana* Suess. (*G. C. de Nevers & H. Herrera 4269*, MO). —B. *Gouania conzattii* Greenm. (*T. B. Croat 45467*, MO). —C. *Gouania croatii* A. Pool (from the paratype *T. B. Croat 13482*, MO). —D. *Gouania ekmanii* Alain (*A. Liogier 6862*, PR). —E. *Gouania eurycarpa* Standl. (*C. Chan V. 4573*, MO). —F. *Gouania guiengolensis* A. Pool (from the paratype *M. L. Torres C. et al. 580*, MO). —G. *Gouania hypoglauca* Standl. (*P. P. Moreno 12408*, MO). —H. *Gouania lupuloides* (L.) Urb. (*S. P. Darwin et al. 2170*, MO). —I. *Gouania obamana* A. Pool (from the paratype *G. Ibarra Manríquez & S. Sinaca C. 3084*, MO). —J. *Gouania polygama* (Jacq.) Urb. (*E. M. Martínez S. et al. 35165*, MO). —K. *Gouania pubidisca* A. Pool (from the paratype *W. D. Stevens & O. M. Montiel J. 33195*, MO). —L. *Gouania rosei* Wiggins (*R. Moran 19034*, MO). —M. *Gouania stipularis* DC. (*Y. Mexía 8887*, MO). —N. *Gouania velutina* Reissek (*R. L. Liesner 4338*, MO).

distance between the highest points of the two wings, the width of the mericarp, and the width of the fruit body. Relative width of the mericarp to height of the fruit body as well as width of the fruit body to width of the mericarp is also given. The two shapes can also be defined by relative measurements: in dumbbell-shaped mericarps, the width across the entire mericarp is 2.5–4(–5) times the height of the fruit body and (rarely, or) the distance between the highest points of the two wings of the mericarp usually 1.5–3 times the height of the fruit body, whereas in butterfly-shaped mericarps the width across the entire mericarp is 1–2.8(–3.2) times the height of the fruit body and the distance between the highest points of the two wings of the mericarp $\leq$ 1(–1.5) times the height of the fruit body. For most of the North American species with butterfly-shaped mericarps, the width of the mericarp is only to twice the height of the fruit body. The only exceptions are *G. conzattii* (Fig. 2B, 2–3 times), *G. lupuloides* (Fig. 2H, 1.5–3.2 times), and *G. pubidisca* (Fig. 2K, 2–2.5 times), and in *G. lupuloides* and *G. pubidisca* the distances between the highest points of the two wings of the mericarp are less than to equal to the height of the fruit body. However, *G. conzattii* measures ca. 1.5 times the height of the fruit body, and its mericarps are therefore somewhat intermediate between the two types. In North America, only *G. croatii* (Fig. 2C), *G. obamana* (Fig. 2I), and *G. polygama* (Fig. 2J) have dumbbell-shaped mericarps. Unfortunately, the mericarp wings of all species of *Gouania* develop late in the ontogeny of the fruit, and wingless immature fruits may open in the press and appear to have nearly mature seeds. Mericarps vary in size from a fruit body height of 3 mm in *G. croatii* (Fig. 2C) and *G. polygama* (Fig. 2J) to 12 mm in *G. hypoglauca* (Fig. 2G), and mericarp width ranges from 6 mm in *G. rosei* (Fig. 2L) and *G. stipularis* (Fig. 2M) to 20 mm in *G. obamana* (Fig. 2I).

The two most common and widely distributed species of *Gouania* in North America have glabrous or nearly glabrous mericarps, one (*G. polygama*) dumbbell-shaped and one (*G. lupuloides*) butterfly-shaped. However, most of the species in our area have persistently pubescent mericarps: *G. croatii*, *G. ekmanii*, *G. eurycarpa*, *G. ferruginea*, *G. hypoglauca*, *G. obamana*, *G. pubidisca*, *G. rosei*, and *G. velutina* (as noted in Tables 1–4). All species of *Gouania* in North America have more or less pubescent hypanthia, and the young fruits have some trichomes. However, in species with nearly glabrous mature mericarps, the very young developing fruits are usually sparsely pilose (sparsely puberulent in *G. colombiana*, sometimes sparsely sericeous in *G. lupuloides*, rarely abundantly pilose in *G. polygama*). The very young fruits of most species with persistently pubescent mature mericarps are densely velutinous and resemble miniature pompom balls with trichomes at right angles to the surface (Fig. 9E, 10B, 13C; those of *G. hypoglauca* sometimes tomentose and of *G. rosei* sometimes pilose).

Fruits of most North American *Gouania* species have no notable coloration patterns on the internal surfaces of the mericarps. The wings and fruit body are more or less the same pale color or the fruit body is slightly darker. Notable exceptions are *G. guiengolensis* (Fig. 2F) and *G. rosei* (Fig. 2L), the fruit bodies of which dry dark red-brown and contrast sharply with the pale wings. The fruit body of *G. stipularis* (Fig. 2M) usually dries medium to dark

Table 2. Distribution of *Gouania* Jacq. in Mexico, by state. *Gouania* species with pubescent mericarps are indicated in boldface.

	G. conzattii	***G. eurycarpa***	*G. guiengolensis*	*G. lupuloides*	***G. obamana***	*G. polygama*	***G. pubidisca***	***G. rosei***	*G. stipularis*	***G. velutina***
Baja								X		
Sonora								X		
Chihuahua				X				X		
Sinaloa				X				X		
Nayarit	X			X			X	X	X	
Jalisco	X			X				X	X	
Colima	X							X	X	
Michoacán				X				X	X	
Guerrero	X			X			X	X	X	
Oaxaca	X		X	X	X	X	X	X	X	X
Chiapas		X		X	X	X	X			
Durango				X						
México	X			X					X	
Morelos				X						
Tamaulipas				X						
San Luis Potosí				X		X				
Querétaro				X		X				
Hidalgo				X		X				
Tlaxcala	X									
Puebla	X			X	X	X				
Veracruz				X	X	X				
Tabasco				X	X	X				
Campeche	X			X		X				
Yucatan	X			X						
Quintana Roo	X			X						

brown, in strong contrast to the wings. The fruit body of *G. velutina* (Fig. 2N) dries grayish red-brown with distinctive rays extending into the wings. Faint rays in the wings can be seen in *G. croatii*.

Reproductive Biology

There are numerous references to polygamy in the genus *Gouania* (e.g., Standley & Steyermark, 1949; Nowicke, 1971; Medan & Schirarend, 2004). However, in North America, the species all appear to bear only perfect flowers that are protandrous. The stamens are first released from the enclosing petals and the anthers dehisce. The pistillate phase then begins (usually not until after the pollen has been released) with the exsertion of the style through the annulus of the floral disc.

Mericarp Dispersal

The assumption is that the winged mericarps of *Gouania* are wind-dispersed (Ridley, 1930). Medan

Table 3. Distribution of *Gouania* Jacq. in Central America (excluding Mexico). *Gouania* species with pubescent mericarps are indicated in boldface.

	G. colombiana	***G. croatii***	***G. eurycarpa***	***G. ferruginea***	***G. hypoglauca***	*G. lupuloides*	***G. obamana***	*G. polygama*	***G. pubidisca***	***G. velutina***
Guatemala			X	X		X	X	X	X	
Belize			X			X	X	X		
El Salvador						X		X	X	
Honduras			X	X		X	X	X		
Nicaragua					X	X		X	X	
Costa Rica	X				X	X		X		X
Panama	X	X			X	X		X		X

Table 4. Distribution of *Gouania* Jacq. in Florida and the islands of the Caribbean region. *Gouania* species with pubescent mericarps are in boldface.

	G. ekmanii	*G. lupuloides*	*G. polygama*	***G. velutina***
Florida		X		
Bahamas		X		
Cuba	X	X	X	
Jamaica		X		
Hispaniola		X	X	
W Puerto Rico		X	X	
E Puerto Rico		X		
Lesser Antilles excluding Grenada, St. Vincent, and Barbados		X		
St. Vincent		X	X	
Grenada		X	X	
Barbados		X		
Tobago			X	
Trinidad			X	X

(1989) studied, using scanning electron microscopy, the dissected mericarps of six species of *Gouania*, including one North American species (*G. polygama*) with dumbbell-shaped mericarps and two (*G. colombiana* and *G. lupuloides*) with butterfly-shaped mericarps. All have the majority of the wing tissue made up of parenchymatous cells that are apparently filled with air at fruit maturity (Medan, 1989), presumably making the mericarps lighter. The rate of descent was studied only for *G. polygama*, the mericarps of which were found to spin tightly around a vertical line before a period of free descent, similar to the fruits of wind-dispersed species in other taxa. However, it is possible that water dispersal may also be relevant. One mericarp of each North American species (excluding *G. ekmanii* and *G. ferruginea*) was placed in a beaker of water on my desk. The time the mericarps stayed afloat varied from ca. 24 hours (*G. croatii*, *Croat 7984*; *G. rosei*, *Castrejón R. et al. 976*; *G. stipularis*, *Mexía 8887*) to 24 days (*G. colombiana*, *de Nevers & Herrera 4269*; *G. guiengolensis*, *Torres C. et al. 238*). This preliminary survey did not show any pattern suggesting a relationship between mericarp shape, pubescence, or relative fruit body and mericarp sizes to floatability. However, the capacity to stay afloat for up to 24 days with no damage to the mericarp or seed clearly suggests that water might play a role in dispersal.

Geographic Distribution

Tables 2 through 4 categorize the geographic distributions of the North American species of *Gouania* by Mexican state (Table 2), Central American country (Table 3), and Caribbean region islands (and Florida) (Table 4). The known distributions of the species are mapped on Figures 3 through 8. *Gouania* species are very commonly collected, and the maps should reflect fairly accurately their true distributions. Most of the species are found primarily in dry to very dry habitats from 0 to 1000 m elevation. Exceptions to this are *G. colombiana* (Fig. 6A), *G. croatii*, and *G. hypoglauca* (both, Fig. 6B), which are found in wet to very wet evergreen forests. *Gouania obamana* (Fig. 4A) is found only in evergreen forests, and *G. polygama* (Figs. 4B, 7B, 8B) is usually found in evergreen and sub-evergreen forests from 0 to 500 m, but sometimes is found in dry forest to 1200 (rarely to 1800) m. *Gouania lupuloides* (Figs. 3, 7A, 8A) is usually found in dry thickets, oak forests, and deciduous to sub-deciduous forests from 0 to 1700 m, but is sometimes found in sub-evergreen to evergreen forests. *Gouania eurycarpa* (Figs. 3, 5B) is found in sub-deciduous to sub-evergreen forests, apparently in wetter habitats than *G. lupuloides*, as illustrated by their relative distributions on the Yucatan Peninsula (Fig. 3). *Gouania conzattii* (Fig. 3) and *G. ferruginea* (Fig. 5B) are found only at higher elevations (1500–2200 m) than most species of *Gouania*, in oak, oak-pine, or *Liquidambar* L. forests. *Gouania rosei* (Fig. 5A) and *G. velutina* (Fig. 5A, 6A, 8A) are probably found in the driest habitats, the former in sub-deciduous, deciduous, and thorn forests and the latter in savanna and dry shrub land. *Gouania polygama* and *G. lupuloides* have overlapping geographic distributions in most of the Caribbean Islands. However, *G. polygama* (Fig. 8B) is absent from Jamaica, eastern Puerto Rico, and all but the southernmost islands of Lesser Antilles, but is present in Trinidad and Tobago, while *G. lupuloides* (Fig. 8A) is present in Jamaica, all of Puerto Rico and all of the Lesser Antilles, but absent from Trinidad and Tobago.

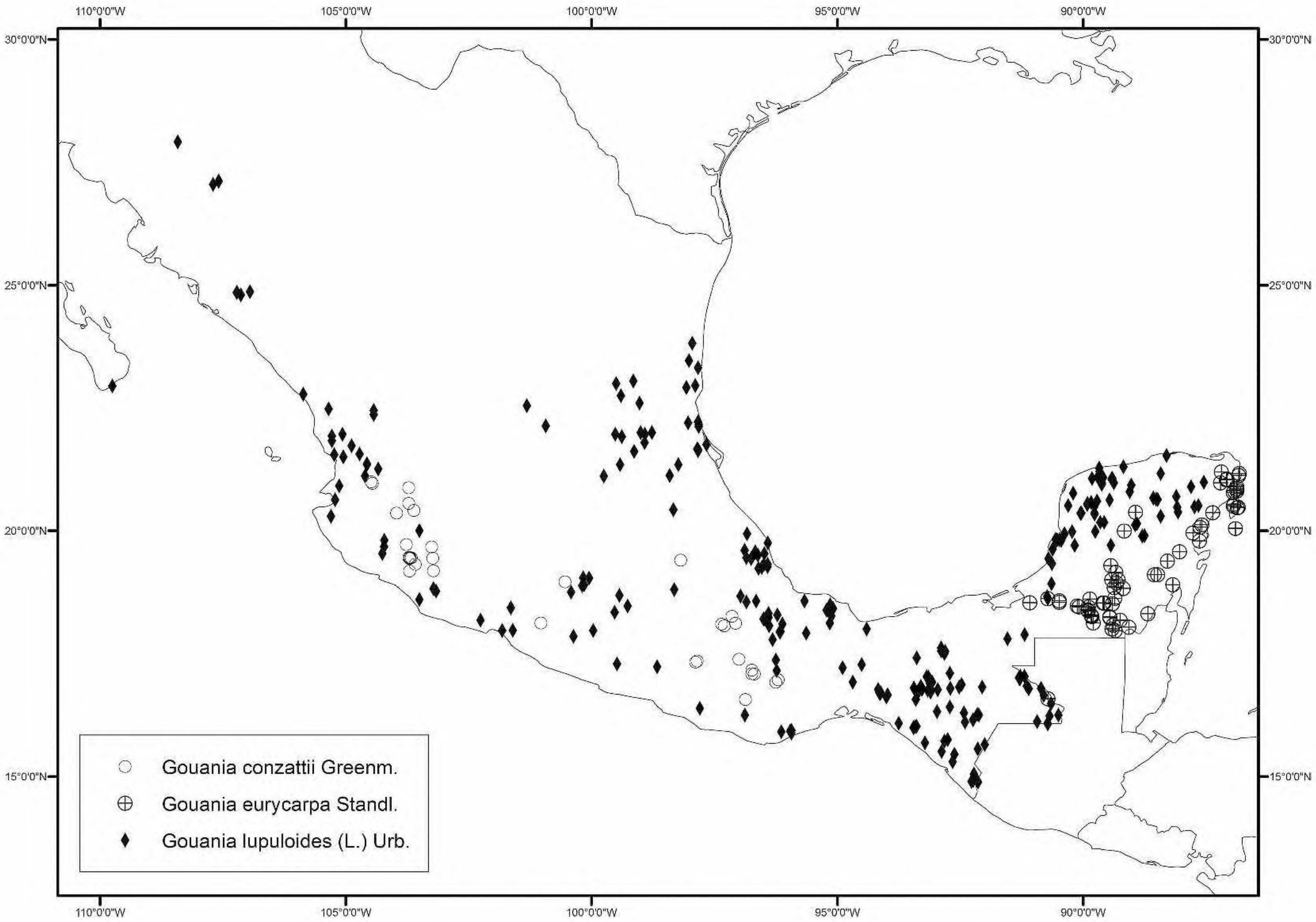


Figure 3. Geographic distribution of *Gouania conzattii* Greenm., across its known distributional range. Geographic distribution of *G. eurycarpa* Standl. and *G. lupuloides* (L.) Urb. in Mexico. See also the mapped distributions for *G. eurycarpa* in Central America (Fig. 5B) and *G. lupuloides* in Central America (Fig. 7A) and in the Caribbean region (Fig. 8A).

The vegetation-type patterns cited above (and in the taxonomic portion of this paper) are based on herbarium labels. As the highest diversity of species is found in Pacific to central Mexico, it is interesting to compare the species distribution maps in Mexico (excluding the widespread *Gouania lupuloides* and *G. polygama*) to the vegetation zones depicted on the "Mapa Esquemático de la Vegetación de México" of Rzedowski (1981: fig. 179). There are good correlations, and what seem to be oddly spotty species distributions actually follow the mosaic of vegetation types. Vegetation types for each Mexican species (excluding *G. lupuloides* and *G. polygama*), following Rzedowski (1981: fig. 179), are: *G. conzattii*, "bosque de coniferas y de quercas"; *G. eurycarpa*, "bosque tropical perennifolio"; *G. guiengolensis*, "bosque tropical caducifolio"; *G. obamana*, "bosque tropical perennifolio"; *G. pubidisca*, "bosque tropical subcaducifolio," with a few collections in "bosque tropical caducifolio"; *G. rosei*, "matorral xerofilo" and "bosque espinoso," with a few collections in "bosque tropical caducifolio"; *G. stipularis*, "bosque espinoso," "bosque tropical caducifolio," and "bosque tropical subcaducifolio"; and *G. velutina*, "bosque espinoso." Given the frequency of *Gouania* collections and the habitat specificity of most species (excluding *G. lupuloides* and *G. polygama*), it is suggested that *Gouania* species might be used as indicators to follow climate-based changes in vegetation.

Materials and Methods

All specimens examined as part of this study have been incorporated into the Missouri Botanical Garden database-management system TROPICOS, <http://www.tropicos.org/>, which now contains label information for all Western Hemisphere *Gouania* specimens housed at MO, in addition to those received on loan from A, B, BM, CAS, F, G, GH, K, M, MEXU, MICH, MSB, NY, PR, TEX, and US. Specimens determined by the author were selected from this database to generate the numbered exsiccatae (Appendix 1) and the distribution maps, the latter with the assistance of Burgund Bassüner. Dots on the maps (Figs. 3–8) represent a majority of the specimens examined by the author, including specimens with geographic coordinates provided on collection labels and those for which the author was able to estimate the geographic coordinates. These same coordinates were used by Bassüner to deter-

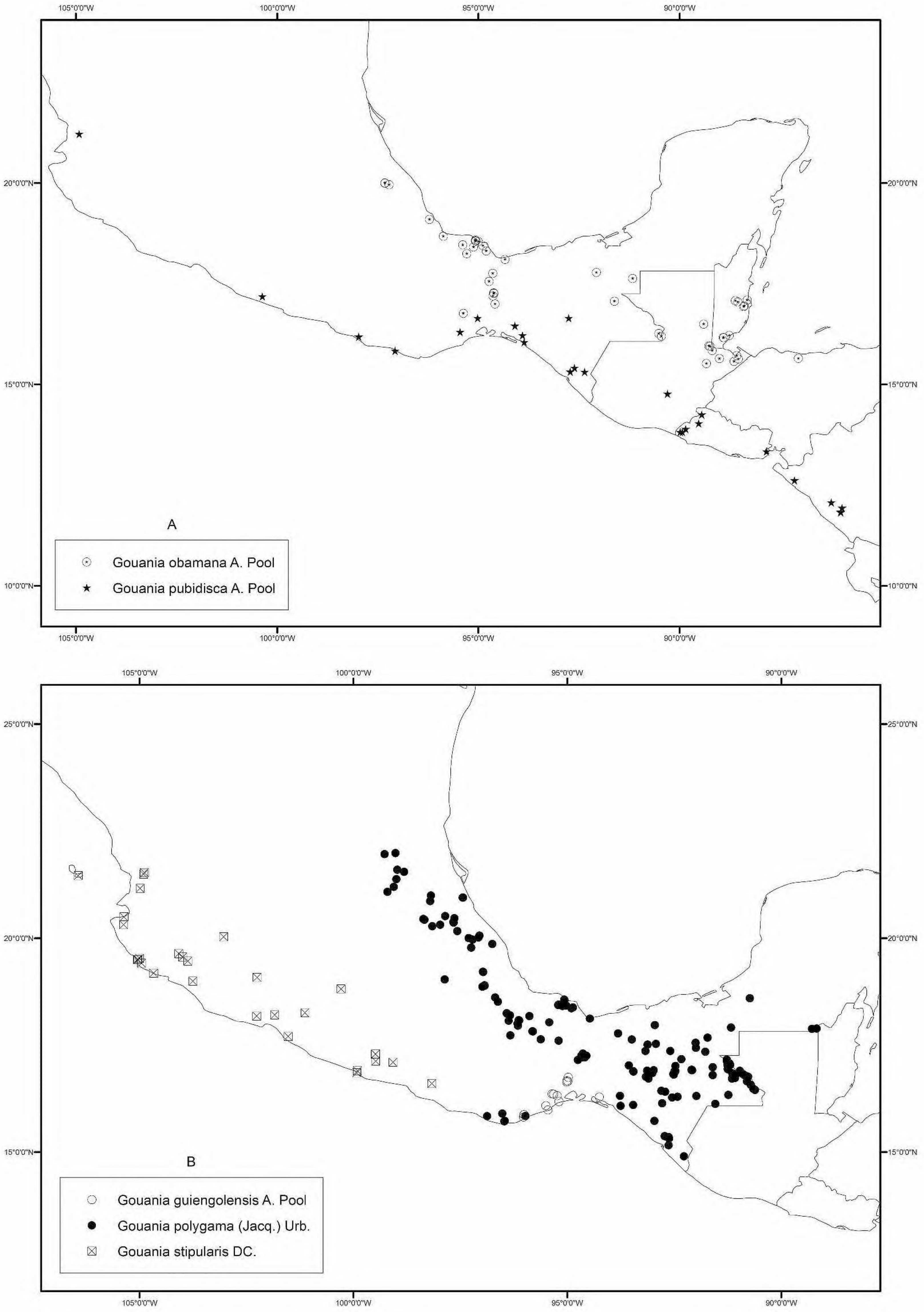


Figure 4. —A. Geographic distribution of *Gouania obamana* A. Pool, across its known distributional range. Geographic distribution of *G. pubidisca* A. Pool across its known distributional range. —B. Geographic distribution of *G. guiengolensis* A. Pool across its known distributional range. Geographic distribution of *G. polygama* (Jacq.) Urb. in Mexico. See also the mapped distributions for *G. polygama* in Central America (Fig. 7B) and in the Caribbean region (Fig. 8B). The distribution of *G. polygama* across South America is not mapped. Geographic distribution of *G. stipularis* DC. across its known distributional range.

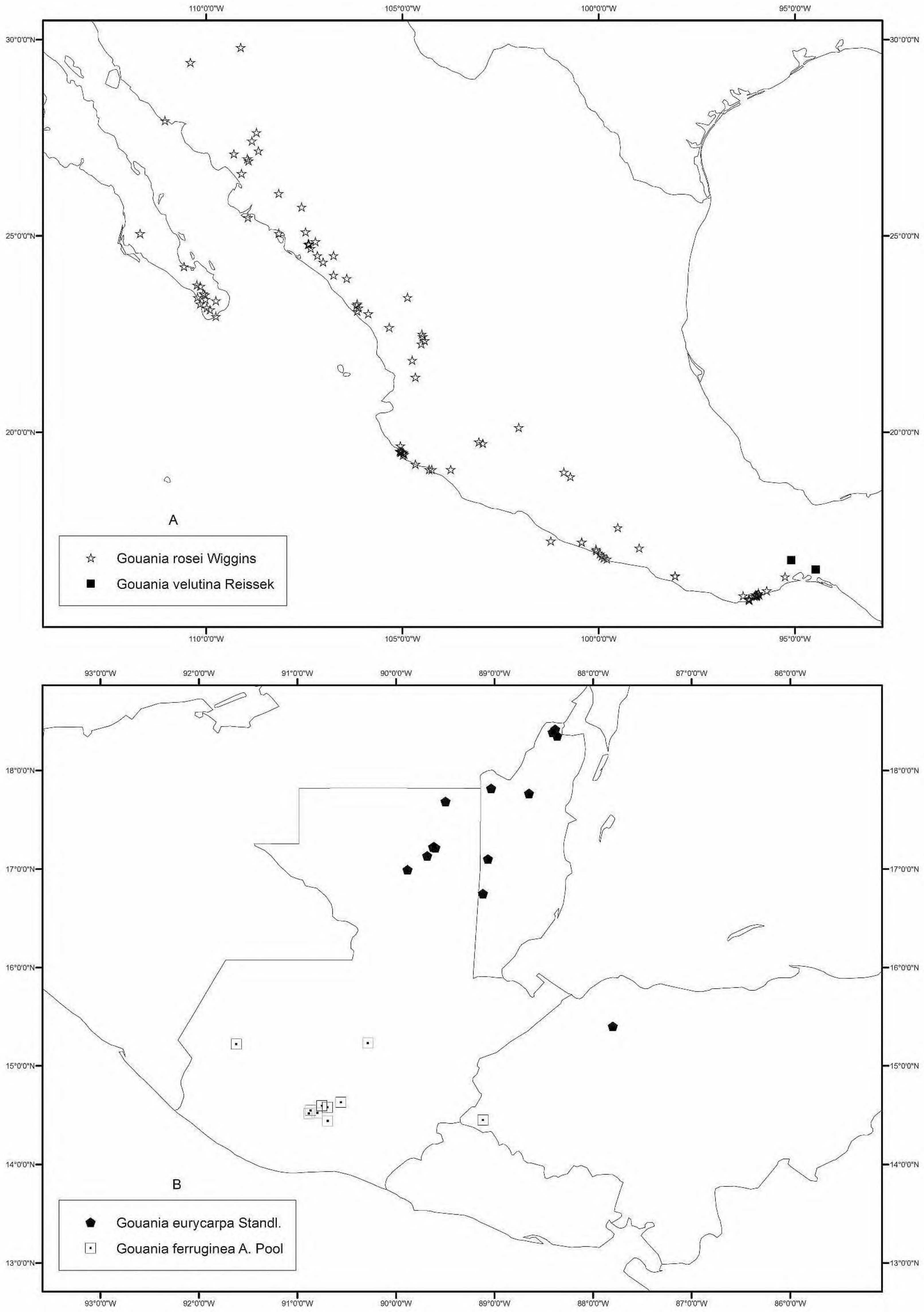


Figure 5. —A. Geographic distribution of *Gouania rosei* Wiggins, across its known distributional range. Geographic distribution of *G. velutina* Reissek in Mexico. See also the mapped distributions for *G. velutina* in Central America (Fig. 6A) and in the Caribbean region (Fig. 8A). Specimens of *G. velutina* from South America are not mapped. —B. Geographic distribution of *G. eurycarpa* Standl. in Central America. See also the mapped distributions for *G. eurycarpa* in Mexico (Fig. 3). Geographic distribution of *G. ferruginea* A. Pool across its known distributional range.

mine species occupancy extent and occupancy area. Locality information for specimen citations has been truncated; more specific locality data are available at the TROPICOS website.

In the following descriptions, tooth glands described are those above the leaf blade base.

The shape of the mericarp is very helpful in distinguishing the species of *Gouania* (Fig. 2A–N). To help define the shape of mericarps, the following measurements were made: height of fruit body, height of mericarp wing, distance between highest points of two wings, width of mericarp, and width of fruit body.

An attempt has been made to determine conservation status for each taxon based on IUCN (2012) criteria. However, these estimates are based only on estimated occupancy, area, and extent, which themselves are based on herbarium specimens, many of which were geo-referenced after the fact based on vaguely recorded collection localities. In addition, for most of the species of *Gouania* treated here, the extents of occupancy are useless because the distribution polygons include large areas of ocean. Changes in occupancy (Bb, c), potential threats, and area size affected by threats (criteria for IUCN size of location Ba), population reduction (A), and number of mature individuals (C, D) are not known for any of the taxa treated here. As many of the species are known only from dry forests, further study is strongly recommended to determine their conservation status. Extent and area of occupancy and area of occupancy outside protected areas were all calculated by Bassüner.

Taxonomic Treatment

Gouania Jacq., Select. Stirp. Amer. Hist. 263. 1763.
TYPE: *Gouania tomentosa* Jacq.

Lianas or scandent shrubs, climbing by circinate tendrils that originate from axils of leaves, especially those subtending inflorescences or terminating axillary branches, or cyme bracts, unarmed. Leaves alternate, petiolate; glands at junction of leaf and petiole frequently stipitate or foliaceous; dentate, each tooth with an apical gland; stipules present, often persistent, unlobed or more frequently 2(3)-lobed. Inflorescences axillary or terminal, racemiform or paniculate thyrses composed of small, multiflowered cymes, the cymes subtended by bracts; peduncles of cymes usually very short, pedicels elongating as flowers mature. Flowers bisexual (in North America, reportedly [Medan & Schirarend, 2004] sometimes unisexual by abortion, the plants polygamous, not observed), 5-merous; hypanthium shallowly obconical to campanulate, adhering to the ovary; sepals triangular, valvate in bud, adaxially keeled, persistent; petals usually smaller than or equal to sepals in length, strongly concave, short-clawed, apically rounded to bifid, white or greenish white, enfolding the stamens, deciduous; stamens opposite petals, the filaments linear to narrowly triangular, adnate to base of petals; anthers dehiscing by longitudinal slits; disk broadly annular, epigynous, fleshy, nectiferous, glabrous or pubescent (the trichomes sometimes restricted to the annulus), with 5 lobes (possibly of staminodial origin) opposite the sepals (rarely unlobed), the lobes entire or apically 2- or irregularly lobed; ovary inferior, 3-locular; style trifid, usually exerted through disc annulus after stamen dehiscence; stigmas 3, small. Fruit a dry schizocarp, 3-winged at maturity, separating septicidally into three 2-winged mericarps, each of which remains temporarily attached apically and suspended from 2 carpophores; mericarps indehiscent, 1-seeded, the external surface usually initially with some trichomes, at maturity densely pubescent or glabrescent, internally drying sometimes with darker pigmentation over fruit body, coloration sometimes extending by ray-like projections onto wings; seeds ellipsoid, slightly ventrally concave and dorsally convex, often shiny brown.

Key to Species of *Gouania* of North America, from Florida and Mexico to Panama and the Islands of the Caribbean Region

1a. Fruits glabrous or with few trichomes over fruit bodies only (rarely with few trichomes on wings in *G. polygama*).
  2a. Fruit mericarps dumbbell-shaped, the wings attached ± to the sides of fruit body only, height of fruit body (2.5–)3–4 mm, the width across the entire mericarp 3–4(–5)× height of fruit body and (rarely, or) distance between highest points of 2 wings of mericarp usually 2–3× height of fruit body; annulus of disc pubescent, the disc lobes variable in shape (often lanceolate, acuminate), frequently apically tapering, (1/3–)2/5–3/5 (–2/3) length of sepals ..... 11. *G. polygama*
  2b. Fruit mericarps butterfly-shaped, the wings attached to apex and base of fruit body as well as sides, height of fruit body 4–10 mm, the width across the entire mericarp 1–2.8(–3.2)× height of fruit body and distance between highest points of 2 wings of mericarp ≤ 1(–1.5)× fruit body height; annulus of disc glabrous or, if pubescent, the disc lobes generally square or transversely rectangular, rarely apically tapering, (1/4–)1/3 (–1/2) length of sepals.
    3a. Disc lobes lanceolate, acuminate, 3/4–1× length of sepals; leaves nearly glabrous with concentration of minute appressed trichomes at apex; mature mericarps with fruit body height 6–10 mm, fruit body width 1/6–1/4 mericarp width; Costa Rica to South America ..... 1. *G. colombiana*

3b. Disc lobes usually square or transversely rectangular and not apically tapering, 1/10–2/5(–1/2) length of sepals; leaves variously pubescent, but not with trichomes distributed as above; mature mericarps with fruit body height 4–7 mm, fruit body width (1/5–)1/4–3/5 mericarp width; Mexico to Panama and West Indies.

4a. Stipules 3-lobed (with 2 large lateral rounded lobes and 1 central narrow lanceolate, acuminate lobe), usually at least some retained into fruit; disc lobes 1/10–1/4 length of sepals ... 14. *G. stipularis*

4b. Stipules unlobed or bilobed (sometimes with large glandular teeth in *G. lupuloides*), rapidly caducous to retained in fruit; disc lobes (1/6–)1/5–2/5(–1/2) length of sepals.

5a. Stipules unlobed, linear, usually lost in flower; internal surface of mature mericarps with fruit body drying dark red-brown and strongly contrasting with wings, width of fruit body 3/5 width of mericarp, width of mericarp 1–1.5× height of fruit body; annulus of disc with some trichomes; Mexico, Isthmus of Tehuantepec, mainly on or near Cerro Guiengola, at 30–720 m elevation ..... 7. *G. guiengolensis*

5b. Stipules bilobed, the lobes variously shaped (but at least one lanceolate, acuminate, or narrowly triangular), usually at least some retained in fruit; internal surface of mature mericarps with fruit body drying only slightly or moderately darker than wings, width of fruit body 1/5–1/2(–3/5) width of mericarp, width of mericarp 1.5–3.2× height of fruit body; annulus of disc glabrous or, if with trichomes, then from Mexico, Nayarit to northern Oaxaca and (400)1000–2300 m elevation.

6a. Lateral leaf veins (5)6 to 8 per side of midrib; flowers sessile (rarely with pedicels to 1 mm); hypanthium and sepals densely villous, hypanthium drying with white trichomes, sepals with ferruginous or ferruginous and white trichomes; annulus glabrous or pubescent; distance between highest points of 2 wings of mericarp 7–10 mm, 1/2–3/4 width of entire mericarp; western and central Mexico, (400)1000–2200 m elevation; flowering May to October, peaking June to August ..... 2. *G. conzattii*

6b. Lateral leaf veins (3)4 to 6 per side of midrib; flowers with pedicels (0.5–)1–3(–4) mm; hypanthium and sepals sparsely to densely sericeous or (rarely) tomentose, drying with trichomes concolorous, from white to red-brown or ferruginous; annulus glabrous; distance between highest points of 2 wings of mericarp 3–7 mm, (1/4–)1/3–1/2(–3/5) width of entire mericarp; southern Florida, Mexico to Panama and West Indies, 0–1700(–2300) m elevation; flowering (rarely July) August to February (rarely March to May), peaking in September and October where sympatric with *G. conzattii* ..... 9. *G. lupuloides*

1b. Fruits densely pubescent with numerous trichomes on fruit bodies and wings.

7a. Disc (excluding, or often including, lobes) entirely covered with trichomes, or trichomes around annulus and extending in numerous rays from annulus onto disc (rarely only around annulus in *G. hypoglauca*).

8a. Abaxial surface of leaves totally covered between venation with trichomes to 0.1 mm long (rarely lost with age), only visible at 20× magnification, tightly appressed; lateral veins (2)3 or 4(5) per side of the blade midrib; fruits tomentose with trichomes 0.05–0.25 mm, fruit body 6–12 mm high; southeast Nicaragua to Panama, flowering May to September ..... 8. *G. hypoglauca*

8b. Abaxial surface of leaves densely pilose to tomentose (though not totally covered between venation) with trichomes 0.25–0.75 mm, visible at 10× magnification, not tightly appressed; lateral veins 5 or 6(7) per side of the blade midrib; fruits pilose to velutinous with trichomes 0.25–0.5 mm, fruit body 4–7 mm high; western Mexico and Central America, Mexico to Nicaragua (Granada), flowering August to February ..... 12. *G. pubidisca*

7b. Disc entirely glabrous or with trichomes restricted to annulus.

9a. Disc lobes lanceolate, acuminate, (1/2–)2/3–1× length of sepal lobes, the annulus glabrous (rarely with a few trichomes in Trinidad); stipules with the lower lobe ± orbicular or broadly reniform, usually retained into fruit; mature mericarps modified butterfly-shaped, the apex truncate or nearly so ..... 15. *G. velutina*

9b. Disc lobes square or transversely rectangular to lanceolate, acuminate, (1/5–)1/4–1/2 length of sepal lobes, the annulus glabrous or pubescent; stipules without an orbicular lobe, the lower lobe reniform only in *G. croatii* and then usually lost early; mature mericarps butterfly- or dumbbell-shaped, the apex with an emargination, cleft or broad sinus.

10a. Fruit mericarps dumbbell-shaped, the wings attached ± to the sides of fruit body only or to the sides and base, width across the entire mericarp 2.5–4× the height of the fruit body and distance between highest points of 2 wings of mericarp 1.5–2.5× height of fruit body; annulus pubescent; stipules 2-lobed, lost early.

11a. Abaxial surface of leaves densely villous or tomentose over the entire surface; lateral veins (6)7 or 8(9) per side of blade midrib; petioles 6–12 mm; stipules retained through expansion of leaves, the lower lobe reniform; disc lobes lanceolate, acuminate, (1/3–)1/2 length of sepals; width of mericarps 12–15 mm, wings 6–7 mm high, seeds 2–2.2 mm long; Panama and Colombia ..... 3. *G. croatii*

11b. Abaxial surface of leaves with trichomes restricted to lateral vein axils (sometimes also present on venation); lateral veins 3 to 5 per side of blade midrib; petioles 10–25 mm; stipules lost before leaves expand, the lower lobe lanceolate or ovate; disc lobes transversely rectangular or square, 1/4–1/3(1/2) length of sepals; width of mericarps 14–20 mm, wings

(9–)10–14 mm high, seeds ca. 3.5 mm long; Mexico (Veracruz) to Honduras (Atlántida) ..... 10. *G. obamana*

10b. Fruit mericarps butterfly-shaped, the wings attached to apex and base of fruit body as well as sides, width across the entire mericarp 1.25–2× the height of the fruit body and distance between highest points of 2 wings of mericarp ≤ 1× height of fruit body; annulus pubescent or glabrous; stipules unlobed (or nearly so), or 2-lobed and usually retained.

12a. Stipules lost early, unlobed and lanceolate, acuminate (rarely with minute subulate foot); mericarps 6–9 mm wide, height of wings 4–6 mm, internal surface with fruit body drying dark red-brown, strongly contrasting with wings; Pacific Mexico ..... 13. *G. rosei*

12b. Stipules usually retained, with 2 lanceolate, acuminate lobes; mericarps 8–15 mm wide, height of wings 6–11 mm, internal surface with fruit body drying light brown, light gray-brown, or green-white, not or only slightly darker than wings; Yucatan Peninsula, Guatemala, Honduras, and Cuba.

13a. Leaves with lateral veins 7 or 8 per side of midrib; flowers and fruits drying dark ferruginous; width of fruit body 2/5 width of mericarp; 1500–2200 m elevation ..... 6. *G. ferruginea*

13b. Leaves with lateral veins 4 or 5(6) per side of midrib; flowers and fruits drying green and white, yellow-white, yellow-brown, or green-yellow; width of fruit body 1/4–1/3 width of mericarp; 0–520 m elevation.

14a. Annulus densely pubescent; mericarp fruit body 4–5 mm high, width of mericarp 8–9 mm; leaves frequently drying bicolored, abaxial surface drying green-white, totally covered between venation with tightly appressed trichomes to 0.1 mm long; Cuba; probably flowering in August ..... 4. *G. ekmanii*

14b. Annulus glabrous; mericarp fruit body (5)6–9 mm high, width of mericarp 11–15 mm; leaves not drying bicolored, the abaxial surface drying green, abundantly to sparsely pubescent (not totally covered between venation) with spreading trichomes 0.2–0.6 mm long; Yucatan Peninsula and Honduras; flowering generally in October and November (rarely through April) ..... 5. *G. eurycarpa*

1. Gouania colombiana Suess., Mitt. Bot. Staatssamml. München 1: 183. 1953. TYPE: Colombia. Meta: Sierra de la Macarena, Caño Entrada, 550 m, 30 Jan. 1950, *J. M. Idrobo 2357* (lectotype, designated here, M!; isolectotypes, BM!, US-2045210!, US-2844701!). Figures 1A, 2A.

Liana; young branches hollow in the center or solid, glabrous to densely and minutely puberulent, trichomes light red-brown. Leaf blades 9–18 × 5–14.2 cm, elliptic to widely elliptic or less frequently lanceolate to ovate, subcoriaceous, adaxial surface drying dark green-black, brown-green, brown (rarely yellow-green), rapidly glabrescent with trichomes retained only at apex, the trichomes 0.1–0.4 mm, straight, appressed and ascending, white, abaxial surface drying often slightly lighter than adaxial surface, dark green-black, brown, light brown, brown-green (rarely yellow-green), almost glabrous excluding trichomes dense at apex and sometimes sparse on veins, trichomes 0.05–0.25 mm, ± straight and appressed, white or red-brown, lateral veins (4)5(6) per side of midrib, diverging at 40°–60° angles, base cordate or subcordate, or less frequently rounded, margin serrulate, usually just apically or nearly entire, tooth glands truncate to cupular, apex acute then short-cuspidate, the margins of the cusp generally thickened; stipules unlobed (Fig. 1A), or often with a small broad foot, often retained through flowering, 1–2 × 1–2.5 mm, erect, appressed, ovate or reniform, acute or rounded, foot (if present) 0.25–0.5 × 0.25–1 mm, pointing downward, appressed, orbicular or ovate, rounded or acute; petioles 15–45 mm. Inflorescence with longest racemiform part 15–27 cm, rachis puberulent with trichomes yellow-white to ferruginous, bract of cyme ca. 1 mm, ovate, acute, cymes with peduncles 2–4.5 mm, mature flowers with pedicels 1.25–2.5 mm, hypanthium densely minutely sericeous or puberulent with trichomes white or yellow-white; sepals 0.7–1 mm, externally abundantly minutely sericeous or puberulent, trichomes white or yellow-white; petals 0.5–1 mm; stamens with filaments 0.5–0.6 mm, anthers 0.2–0.25 mm; disc excluding lobes 1–1.3 mm diam., glabrous, disc lobes 0.5–1 mm, lanceolate, acuminate, entire, 3/4–1× length of sepals; style glabrous. Young fruits sparsely puberulent, trichomes white; mature mericarps butterfly-shaped (Fig. 2A), the wings attached to apex and base of fruit body as well as sides, externally drying brown or yellow-brown, darker over fruit body, glabrous or with sparse, appressed trichomes at apex of fruit body (rarely over whole fruit body) to 0.1 mm, white, internally drying with wings yellow-brown, pale brown or white, with indistinct pale brown streaks, not or slightly contrasting with fruit body, same color as wings or very slightly darker, fruit body 6–10 mm high, wings 11–13 mm high, distance between highest points of 2 wings 5–6 mm, width of mericarp 10–17 mm, 1.2–2.2× height of fruit body, width of fruit body 2–3.2

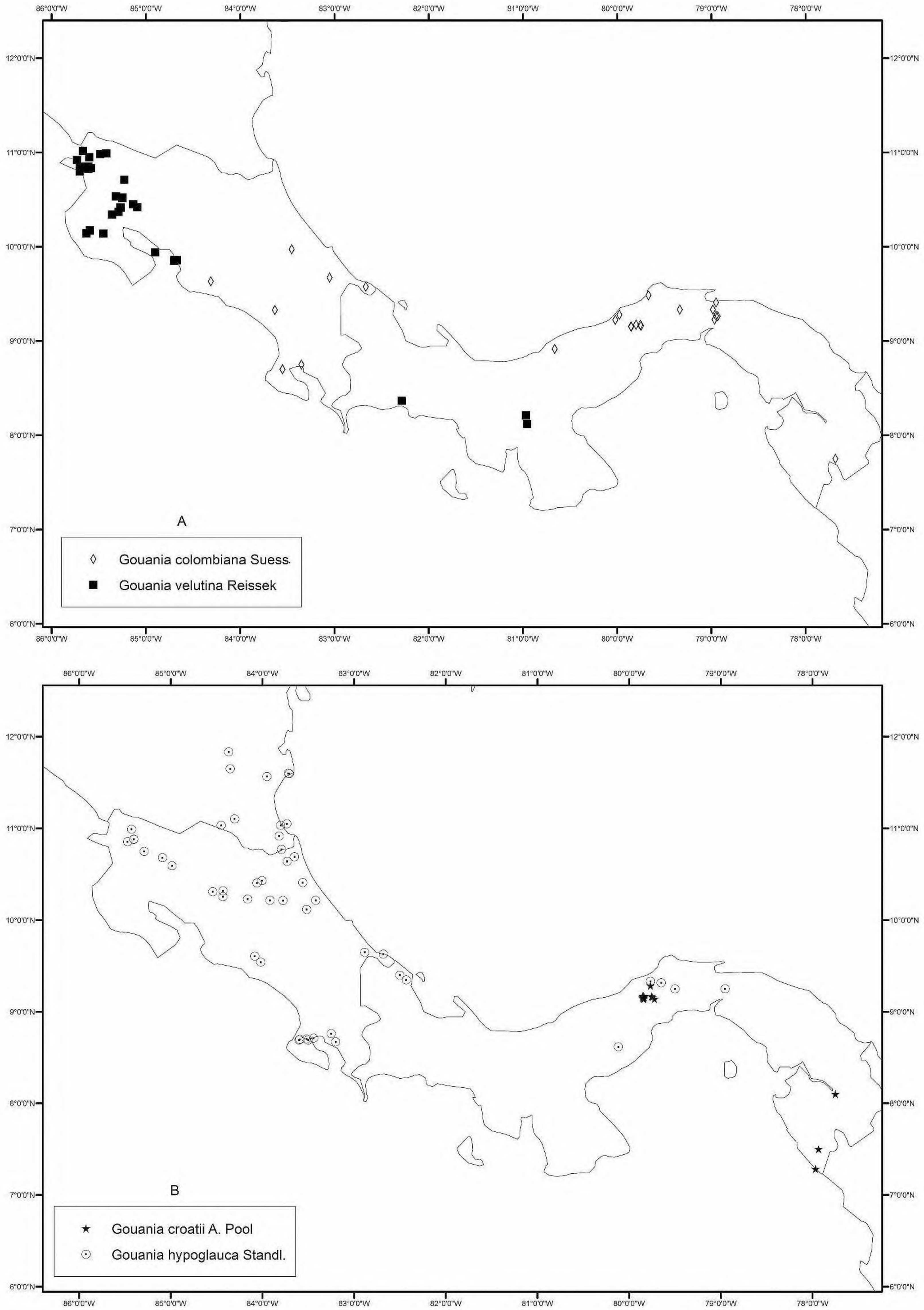


Figure 6. —A. Geographic distribution of *Gouania colombiana* Suess. in North America. Specimens of *G. colombiana* from South America are not mapped. Geographic distribution of *G. velutina* Reissek in Central America. See also the mapped distributions for *G. velutina* in Mexico (Fig. 5A) and in the Caribbean region (Fig. 8A). Specimens of *G. velutina* from South America are not mapped. —B. Geographic distribution of *G. croatii* A. Pool in North America. Specimens of *G. croatii* from northern South America are not mapped. Geographic distribution of *G. hypoglauca* Standl. across its known distributional range.

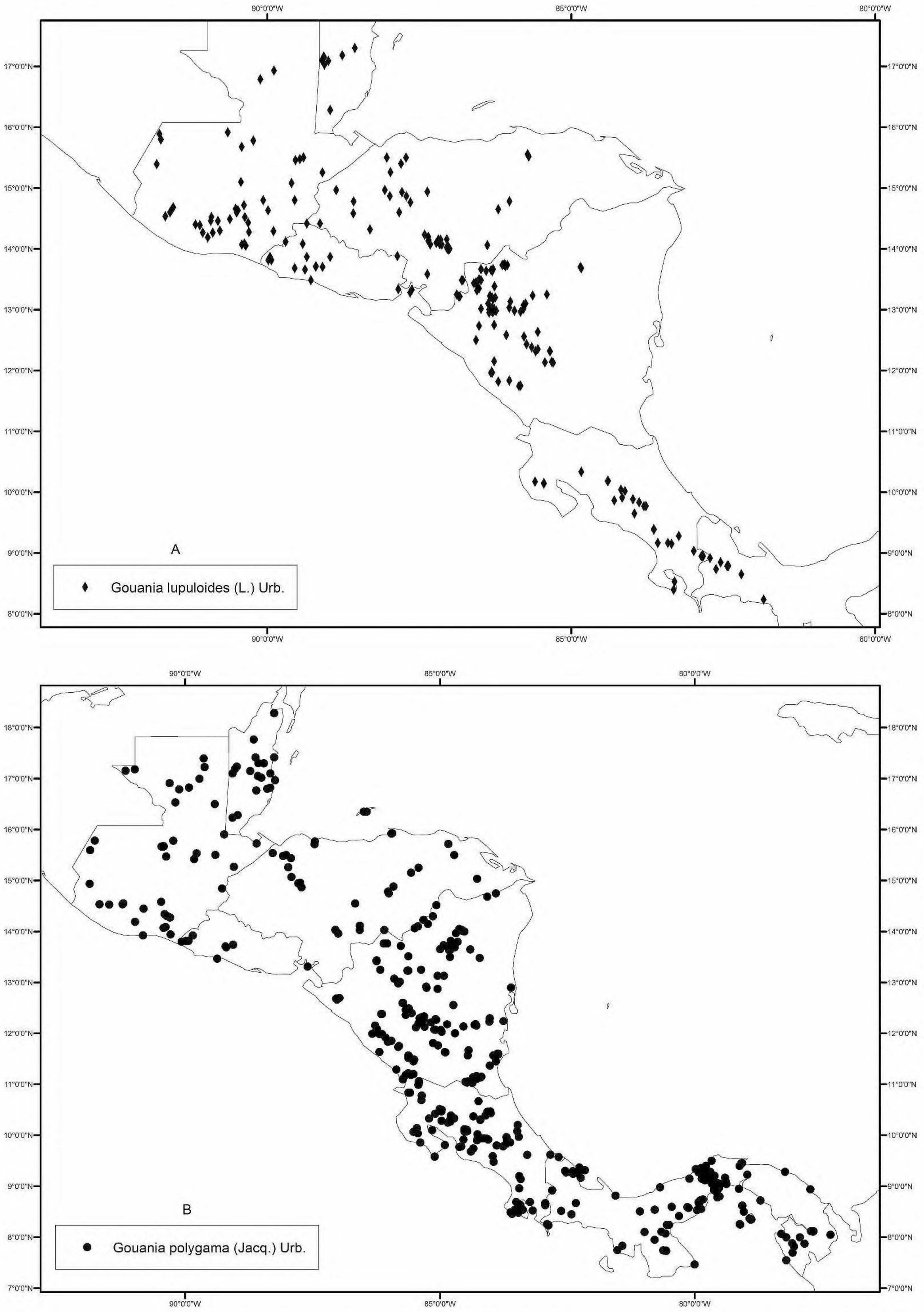


Figure 7. —A. Geographic distribution of *Gouania lupuloides* (L.) Urb. in Central America. See also the mapped distributions for *G. lupuloides* in Mexico (Fig. 3) and in the Caribbean region (Fig. 8A). —B. Geographic distribution of *G. polygama* (Jacq.) Urb. in Central America. See also the mapped distributions for *G. polygama* in Mexico (Fig. 4B) and in the Caribbean region (Fig. 8B). Specimens of *G. polygama* from South America are not mapped.

mm, 1/6–1/4 width of mericarp; seeds ca. 4 × 2 mm, light dull brown.

Habitat and distribution. *Gouania colombiana* is known from Costa Rica, Panama (Fig. 6A), Colombia, Ecuador, and Peru. It is found in wet and very wet forest, 0–600 m elevation, rarely to 1000 m in South America.

IUCN Red List category. This species is assessed as Data Deficient (DD), according to IUCN (2012) criteria. Based on its extent of occupancy, from Costa Rica through northwestern South America, *Gouania colombiana* would appear to be a species with least conservation concern. However, it is not at all common in Central America, with only 26 collections known to the author, and its conservation status requires further study.

Phenology. *Gouania colombiana* has been collected in flower in Central America in July and August (*Hammel et al. 18710*, with a few open flowers in January) and in South America from November to January, and rarely in July and March.

Discussion. Suessenguth (1953b) cited in the protologue of *Gouania colombiana* both the BM and M sheets of *J. M. Idrobo 2357*. Both sheets are annotated by Suessenguth and are of equally useful quality. The M sheet is chosen as the lectotype as it is at the home institution of Suessenguth and includes Suessenguth's drawing of the young fruit, which nicely illustrates the retained sepals and disc lobes.

Nowicke (1971) did not formally treat *Gouania colombiana* for Panama, but included a specimen citation, *Williams 723*, and a description of the same in her discussion below *G. lupuloides*, suggesting that it was a distinct species, but not identifiable from the material at hand. *Gouania colombiana* differs from *G. lupuloides* in its disc lobes (3/4–1× the length of the sepals and lanceolate, acuminate vs. usually 1/5–2/5 the length of the sepals and square to transversely rectangular), width of fruit body (2–3.2 mm, 1/6–1/4 the width of the mericarp vs. 3–5 mm, usually 1/4–1/2 the width of the mericarp), leaves usually glabrous excluding the tip and the tip with thickened margins versus leaf apices not more pubescent than rest of leaf nor with thickened margins, and stipules with upper lobe (or only lobe) ovate or reniform versus upper lobe lanceolate or triangular.

Croat (1978) treated a specimen of this species (*Foster s.n.* [Sep. 1969] from Barro Colorado Island, Panama) as *Gouania adenophora* Pilg. *Foster s.n.* [Sep. 1969] consists of two old mericarps found on the forest floor. One disc lobe is retained, and it is relatively long when compared to the retained sepal and is lanceolate and acuminate. The mericarps in all respects match those of other specimens of *G. colombiana*. The original description of *G. adenophora* is based on flowering material, and I do not know what fruiting specimens can be associated with this name. However, the disc lobes were described by Pilger (1915) as one half the length of the sepal lobes, with the apex truncate to retuse to truncate and then apiculate, different from the retained disc lobe of *Foster s.n.* [Sep. 1969]. Following Croat (1978), the name *G. adenophora* was frequently misapplied to specimens from Panama of *G. colombiana*. Nonetheless, *G. colombiana* is a distinctive species and rarely confused with other species. In addition to the disc lobe character, the type of *G. adenophora* (*E. Ule 16p*, B photo!) differs from *G. colombiana* in the leaves having six and seven lateral veins on either side of the midrib and the blade margins more markedly serrate and lacking apical thickening.

Additional specimens examined from Central America. COSTA RICA. **Cartago:** Turrialba, P. N. Barbilla, *Mora C. & Rojas 1410* (G, MO, NY). **Limón:** Limón, R. B. Hitoy Cerere, *Acosta et al. 2149* (MO), Talamanca, Cuena del Sixaola, *González et al. 1640* (MO; Fig. 1A). **Puntarenas:** Osa, R. F. Golfo Dulce, Rancho Quemado, *Hammel et al. 18508* (MO), *18710* (MO, TEX); Osa, R. F. Golfo Dulce, Serranías de Golfito, *Aguilar 5735* (G, MO); Parrita, cuenca del Pirrís-Damas, Barrio La Vasconia, *Rodríguez G. 7460* (MO). PANAMA. **Canal Area:** Pipeline rd., 5–7 mi. N of Gamboa, *Gentry 2047* (MO, US), *Gentry 3271* (MO); near Indio Tower, NW part of Canal Zone, *Johnston 1597* (A, MICH, MO); hills N of Frijoles, *Standley 27486* (US), *27595* (US); Barro Colorado Island, *Standley 31417* (US), near Armour 700 & Drayton 100 trails, *Foster s.n.* [Sep. 1969] (MO). **Colón:** Achiote, Ft. Clayton, *Tyson et al. 4519* (MO); trail S of Río Guanche, on ridge to Cerro Pan de Azúcar, *Mori & Kallunki 2005* (MO); Donoso Distr., site of proposed copper mine (MPSA), *McPherson & Merello 21204* (MO). **Darién:** around Caña, S Darién, *Williams 723* (NY, US). **Panamá:** headwaters of Río Chagres, Río Esperanza & Río Piedras, *de Nevers 4094* (MO); El Llano–Cartí rd., 9 mi. from Pan American Hwy., *Miller 852* (MEXU, MO, TEX); Chepo, N of El Llano, *Gentry 5572* (MO, TEX, US), Chepo, 5–6 mi. N of El Llano, near San Blas border, *Gentry 5795* (MO). **San Blas:** Nusagandi, El Llano–Cartí rd., *de Nevers & Todzia 3543* (MEXU, MO, TEX); El Llano–Cartí rd., 22–24.5 km from Interamerican Hwy., *de Nevers & Herrera 4269* (CAS, MO; Fig. 2A, NY, TEX, US).

Selected specimens examined from South America. COLOMBIA. **Antioquia:** Anorí, vía Dos Bocas-Providencia, *Callejas et al. 4555* (MO, TEX). ECUADOR. **Morona-**

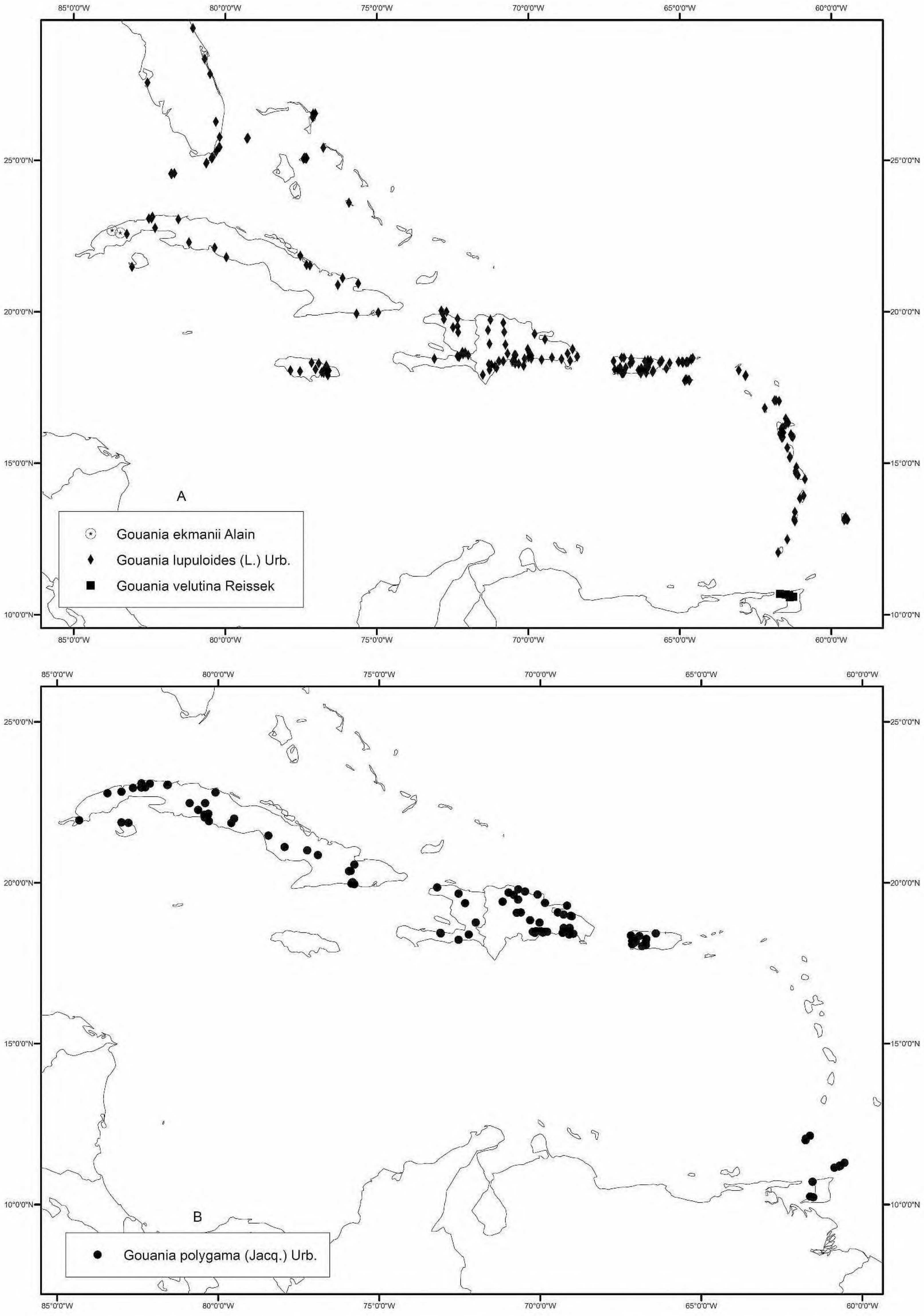


Figure 8. —A. Geographic distribution of *Gouania ekmanii* Alain across its known distributional range. Geographic distribution of *G. lupuloides* (L.) Urb. in Florida and the Caribbean region. See also the mapped distributions for *G. lupuloides* in Mexico (Fig. 3) and in Central America (Fig. 7A). Geographic distribution of *G. velutina* Reissek in the Caribbean region. See also the mapped distributions for *G. velutina* in Mexico (Fig. 5A) and in Central America (Fig. 6A). Specimens of *G. velutina* from South America are not mapped. —B. Geographic distribution of *G. polygama* (Jacq.) Urb. in the Caribbean region. See also the mapped distributions for *G. polygama* in Mexico (Fig. 4B) and in Central America (Fig. 7B). Specimens of *G. polygama* from South America are not mapped.

Santiago: 10 km O del Río Zamora y 2 k S del Río Bomboiza, *Baker 6836* (MO). **Napo:** Cantón Orellana, Sect. Huashito, 20 km N de Coca, prop. Palmoriente, *Rubio 328* (F, MO, TEX), *Gudiño 224* (MO, TEX); Aguarico, Chiro Isla community, N bank of Río Napo, *Bensman 298* (MO); vic. Tena, along rd. to Muyuna, *Croat 58834* (MO, TEX). **Orellana:** P. N. Yasuni, Km. 51 of Maxus Petroleum rd. (= YPF), near Río Natali, *Burnham & Krings 1571* (MICH, MO). **Pastaza:** 10 km al S del límite Napo-Pastaza, vía Auca ca. Río Tigüino, *Palacios 3469* (MO, TEX). PERU. **Amazonas:** Bagua, along rd. Chiriaco–Bagua, *van der Werff et al. 16352* (MO); Bagua, Yamayakat, *Jaramillo et al. 1362* (MO); Condorcanqui, Río Cenepa region, 10 km N of Huampami, *Berlin 861* (MO); Condorcanqui, Río Cenepa region, Quebrada Sasa, Monte, *Kayap 1237* (MO). **Loreto:** mouth of Río Santiago, *Tessmann 4682* (G); Maynas, Yanamono, Explorama Tourist Camp, *Gentry et al. 42963* (MO, TEX). **San Martín:** Rioja, Río Negro, Río Seco & Trapiche, *Woytkowski 6195* (G, MO, US). **Ucayali:** vic. of Aguaytía, *Mathias & Taylor 5019* (F).

2. Gouania conzattii Greenm., Publ. Field Columb. Mus., Bot. Ser. 2: 257. 1907. TYPE: Mexico. Oaxaca: Cerro San Felipe, 1700 m, 15 Sep. 1906, *C. Conzatti 1567* (holotype, F!). Figure 2B.

Liana; young branches solid, densely to sparsely pilose or tomentose, trichomes white to yellow, sometimes mixed with trichomes light red-brown to ferruginous or sometimes only ferruginous. Leaf blades 5–12.5 × 3.7–8 cm, elliptic to ovate, membranaceous, adaxial surface drying green, abundantly sericeous to tomentose (sometimes glabrescent) with trichomes 0.3–0.75 mm, white, abaxial surface drying similar green to adaxial surface to slightly paler, densely to sparsely tomentose with trichomes 0.3–0.75 mm, white, lateral veins (5)6 to 8 per side of midrib, diverging at 45°–70° angles, base subcordate or truncate and then shortly decurrent (rarely cordate), margin crenate to crenulate, 1 to 2 teeth/cm, tooth glands pulvinate (rarely cupular), apex acute or short-acuminate; stipules 2-lobed, often lost early, upper lobe 2–5 × 0.75–1.5 mm, erect, lanceolate, acuminate, lower lobe 1–2.5 × 0.25–1 mm, curving downward, lanceolate, acuminate (rarely linear); petioles 8–43 mm. Inflorescence with longest racemiform part 6–28 cm, rachis densely pilose (rarely tomentose) with trichomes white, white and ferruginous, or ferruginous, bract of cyme 1.75–4.5 mm, lanceolate, acuminate, cymes appearing sessile (rarely peduncle 3.5 mm), mature flowers appearing sessile to rarely pedicels to 1 mm, hypanthium densely villous with trichomes white; sepals 0.9–1.3 mm, externally densely villous, trichomes ferruginous or ferruginous and white; petals 0.75–1.25 mm; stamens with filaments (0.5)0.6–0.8 mm, anthers ca. 0.25 mm; disc excluding lobes 1.2–2 mm diam., glabrous or with few to numerous trichomes along annulus, disc lobes 0.25–0.35(0.5) × 0.35–0.8 mm at apex, square to transversely rectangular, generally apically bilobed, 1/4–1/3(1/2) length of sepals; style glabrous or pubescent at base. Young fruits glabrescent to pilose with trichomes sparse to scattered, ferruginous and white; mature mericarps butterfly-shaped (Fig. 2B), the wings attached to apex and base of fruit body as well as sides, externally drying light yellow-brown, darker brown over fruit body or yellow-green and darker green over fruit body, glabrous or fruit body apically with few appressed trichomes 0.05–0.1 mm, white or ferruginous, internally drying with wings white or yellow-white slightly or moderately contrasting with light to medium gray-brown fruit body, fruit body 5–6 mm high, wings 7–10 mm high, distance between highest points of 2 wings 7–10 mm, width of mericarp 12–15 mm, 2–3× height of fruit body, width of fruit body 4–5 mm, ca. 1/3 width of mericarp; seeds 3.5–3.75 × (2.5)2.75–3.1 mm, shiny brown.

Habitat and distribution. *Gouania conzattii* is known from Pacific to central Mexico, from Nayarit south to Oaxaca and east to México, Tlaxcala, and Puebla. The species is often found in oak forest, or associated with wooded ravines, between 1000 and 1700 (rarely to 2200) m elevations, with one collection (*McVaugh & Koelz 1092*, MICH) from 400 m (Fig. 3).

IUCN Red List category. Assessed as Data Deficient (DD) by IUCN (2012) criteria, *Gouania conzattii* is a mid- to high-elevation species endemic to Mexico. It has a great extent of occupancy, but a relatively low estimated area of occupancy (132 km^2). With 57% of the collections falling outside of protected areas, this species is a candidate for further conservation study.

Phenology. *Gouania conzattii* has been collected in flower from May to October, with its peak from June to August.

Discussion. Standley (1923) suggested that *Gouania conzattii* might be better treated as a form of *G. polygama*. The two species are similar in often having the abaxial surface of the leaves densely pubescent (not always consistent in *G. polygama*) and the annulus of the flowers with trichomes (not always seen in *G. conzattii*). However, *G. polygama* has dumbbell-shaped mericarps and the floral disc lobes

are (1/3–)2/5–3/5(–2/3) the length of the sepals and often apically tapering. Specimens of *G. conzattii* are frequently misidentified as *G. polygama*, *G. lupoloides*, or *G. rosei*. *Gouania lupuloides* can be separated from *G. conzattii* following the key to species; *G. lupuloides* has leaves with usually fewer lateral veins per side (three to six), flowers always pedicellate, sepals and hypanthium drying concolorous, disc annulus always glabrous, and the mericarps of a slightly different shape, i.e., the distance between the highest points of the two wings of the mericarps of *G. lupuloides* 3–7 mm and (1/4–)1/3–1/2(–3/5) the width of the entire mericarp. *Gouania rosei* has mericarps densely pubescent and smaller (height of wings 4–6 mm, width of mericarp 6–9 mm), stipules unlobed or with lower lobe minute, and flowers without ferruginous trichomes. Standley and Steyermark (1949) included *G. conzattii* for Guatemala based on misidentified specimens of *G. lupuloides* (*Aguilar G. 219* and *Standley 61408*). In flower, *G. conzattii* is very similar to *G. ferruginea*, from Guatemala (see discussion under the latter species).

A probable hybrid between *Gouania lupuloides* and *G. polygama* from Chiapas has been observed, which might be confused with *G. conzattii*. It has, in common with *G. conzattii*, six or seven pairs of lateral leaf veins, disc lobes transversely rectangular and 1/3 the length of the sepals, and annulus with trichomes, but differs in the sericeous, yellow-white trichomes on the sepals and hypanthium. For further detail, see discussion under *G. polygama*.

Additional specimens examined. MEXICO. **Colima:** above Río Salado, 5 mi. S of Colima, *McVaugh & Koelz 1092* (MICH); Comala, Rancho El Jabali, ca. 22 km NNW of city of Colima, *Sanders et al. 8586* (TEX), 22 km (airline) NNW of Colima in SW foothills of Volcán de Colima, *Sanders et al. 10886* (MEXU, TEX), *Vázquez V. & Phillips 820* (MEXU, TEX), *Vázquez V. 1610* (MICH), *Vázquez V. & Phillips 911* (MEXU), *Vázquez V. & Phillips 604* (MEXU, TEX), 22 km NNW of city of Colima, near Epazote, *Sanders et al. 8335* (TEX), 20 km (airline) N of Colima in SW foothills of Volcán de Colima, *Sanders et al. 11778* (MICH, TEX); Cuauhtemoc, 3 km al NE de Quesería, límite de Colima–Jalisco, *Santana M. & Cervantes A. 1062* (MEXU). **Guerrero:** Manchón, *Hinton 9615* (K, LL, US). **Jalisco:** Mpio. Zapotitlán, Volcán de Colima, Rancho El Jabalí, 20 km (airline) N of Colima, in the SW foothills of the Volcán de Colima, *Sanders et al. 11843* (MICH, TEX); Agua Fría, brecha a Manuel M. Dieguez, Tamazula, *Díaz L. 3620* (MICH, TEX); Zapotlán, *Ross 456* (M); Acatlán de Juárez, el arroyo Colorado, *Machuca N. 6596* (MICH, TEX); Sierra Madre Occidentale, San Gerónimo, rd. to Quila, *Provance 8166* (MO); Tala, vic. de Ahuisculco, *Machuca N. 7710* (MEXU); Tamazula de Cordiano, Hwy. 110, vic. of Tamazula, *Croat 45467* (MEXU, MO; Fig. 2B); E de Tecalitlán, brecha a Jilotlán, *Villa C. 347* (MICH), *Villa C. et al. 872* (MICH); 13.4 km N de Venustiano Carranza, camino a Tapalpa, *Lott & Solís M. 775* (MEXU, TEX); Mpio. Venustiana Carranza, brecha Venustiana Carranza a Tapalpa, *Vigueras G. et al. 60* (MICH); Mpio. Venustiana Carranza, camino a Rancho de los Ramírez, *Martínez 512* (MEXU); Zapotitlán de Vadillo, Rancho El Jabalí, *Vázquez V. 1462* (MICH, MO). **México:** Temascaltepec, Villaneda, *Hinton 6531* (LL, MICH, NY). **Nayarit:** Arroyo de la Fundición, 5 mi. SE of Ahuacatlán, *McVaugh 16357* (MICH); Ahuacatlán, mtns. 10 mi. SE of Ahuacatlán, *Feddema 331* (MICH). **Oaxaca:** Hac. Guadalupe, 9 June 1907, *Conzatti s.n.* [9 June 1907] (LL, NY); Guadalupe, *Conzatti 1829* (MEXU); valley of Oaxaca, *Nelson 1524* (US); San Lorenzo Albarradas, *Torres B. 2297* (MEXU), *2423* (MEXU); 9 km al NE Teotitlán del camino, rumbo a Huautla, *González M. et al. 1460* (MO); 19 km by rd. NE of Mitla, *Webster & Armbruster 21075* (MEXU, TEX); 18 mi. NE of Sola de Vega, *Webster et al. 13056* (MEXU, MO); Mpio. Tepelmeme, Cañada de Carrizalillo, Cerro Verde, *Tenorio L. et al. 6959* (TEX); Centro, hac. Guadalupe, *Conzatti 4902* (MEXU); Mpio. Telixtlahuaca, Etla, "Parian-Las Sedas," *Salinas T. et al. 6865* (MO); Juxtlahuaca, Río Mixtepec, *Reyes S. 1670* (MEXU); Juxtlahuaca, a 10 km al NO de San Juan Mixtepec, *Reyes S. 2072-A* (F); Nochixtlan, El Parian, *Conzatti 1935* (F); 2.5 km al SO del centro de San Andrés Huayapam, *Carrillo-Reyes 5546* (MO). **Puebla:** Río de Santa Lucía, vic. San Luis Tultitlanapa, *Purpus 3172* (F, GH, MO, NY); Coxcatlán, *Purpus 4198* (F, MO, NY). **Tlaxcala:** Barranca de Tlacuilosto, *Purpus 6498* (G, M).

3. Gouania croatii A. Pool, sp. nov. TYPE: Panama. Darién: Río Jaqué, disturbed tropical wet forest on flat river flood plain, 7°27′N, 78°05′W, 100 m, 29 Jan. 1982, *S. Knapp & J. Mallet 3218* (holotype, MO!; isotypes, TEX!, PMA not seen). Figures 2C, 9A–E.

Diagnosis. New species similar to *Gouania polygama* (Jacq.) Urb. but with pubescent mericarps and the lower lobe of the stipule foliaceous and reniform.

Liana; young branches solid, densely villous or velutinous, trichomes ferruginous to light red-brown. Leaf blades 6–12 × 3–9 cm, widely elliptic, membranaceous, adaxial surface drying dark red-brown (less frequently dark green), moderately to densely sericeous to pilose with trichomes 0.3–1 mm, white to light red-brown, abaxial surface drying yellow-green, densely villous or tomentose with trichomes 0.5–1 mm, spreading and matted, white or tawny or with reddish tint on lateral veins, lateral veins (6)7 or 8(9) per side of midrib, diverging at 25°–45° angles, base narrowed then cordate and finally short-decurrent or narrowed then truncate, margin crenate or crenulate, 0.5 to 2 teeth/cm, tooth glands pustular to cupular at maturity, apex obtuse and apiculate (rarely obtuse and cuspidate); stipules 2-lobed, caducous or retained in part, upper lobe 4.5–7 × 1.5–2.5 mm, spreading upward, lanceolate, often asymmetrically so, acuminate, lower lobe 2.5–4 × 3–5 mm, spreading downward, foliaceous, reniform, frequently strongly concave, the margins strongly

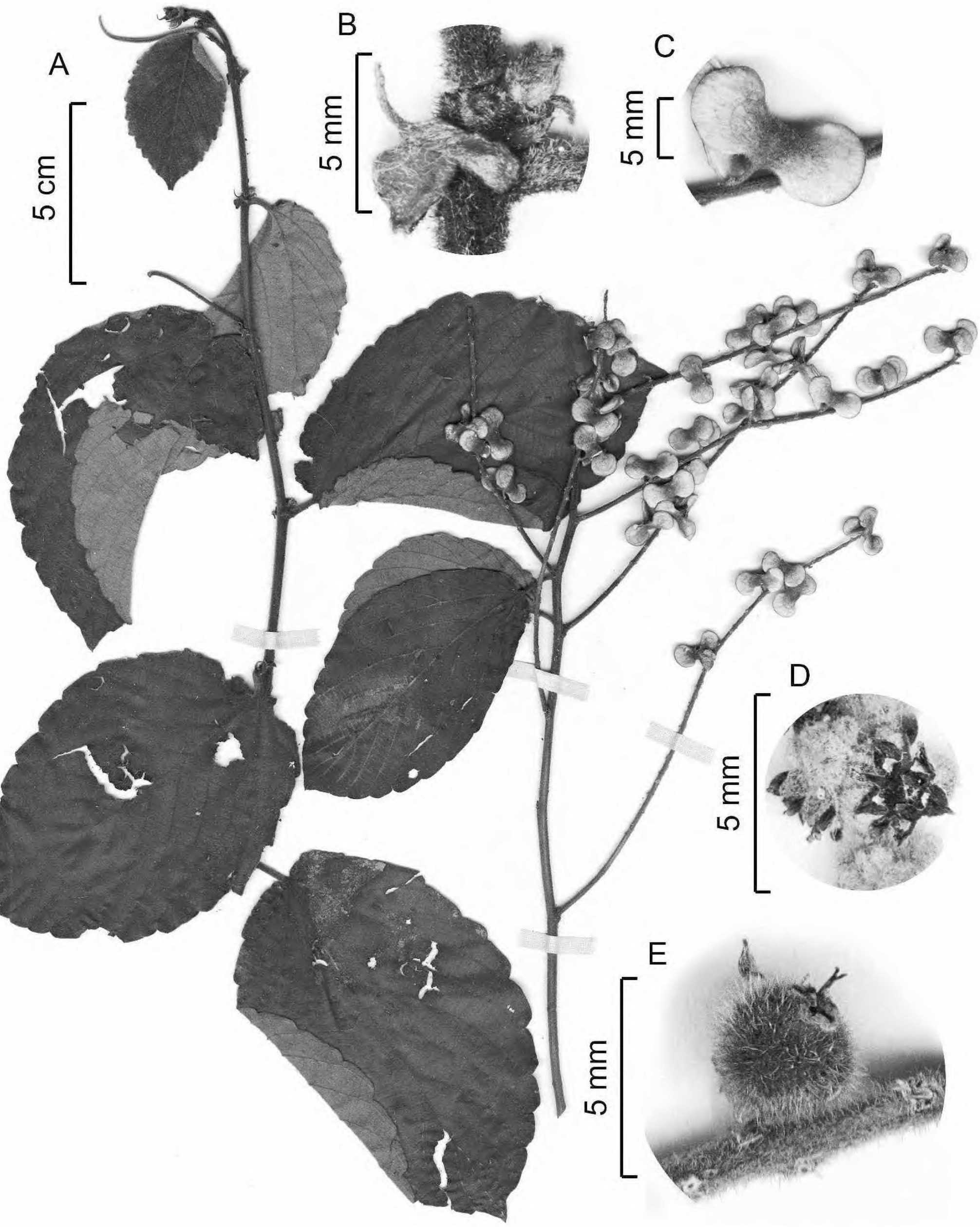


Figure 9. *Gouania croatii* A. Pool. —A. Two branches, one vegetative and one fruiting. —B. Stem node with stipule. —C. Fruit. —D. Flower at inflorescence node. —E. Young fruit. A–C scanned from the holotype *S. Knapp & J. Mallet 3218* (MO); D scanned from the paratype *R. J. Schmalzel & T. M. Aide 106* (MO); and E scanned from the paratype *T. B. Croat 7274* (MO).

curving inward, rounded or rarely with extended caudate tip; petioles 6–12 mm. Inflorescence with longest racemiform part 11–15 cm, indumentum of rachis similar to that of young branches, bract of cyme 2.25–3 mm, narrowly lanceolate, acuminate with a long extended tip, the cymes appearing sessile, mature flowers appearing sessile to pedicels to 0.5 mm, hypanthium and sepals externally densely sericeous with trichomes yellow-white, or occasionally also with scattered ferruginous trichomes; sepals 0.75–1 mm; petals 0.5–0.8 mm; stamens with filaments 0.4–0.8 mm, anthers 0.15–0.25 mm; disc excluding lobes 1–1.4 mm diam., annulus with few to numerous trichomes, disc otherwise glabrous, disc

lobes 0.3–0.5 mm, generally lanceolate, acuminate (or with some to 0.2 mm wide at apex), apically entire or bilobed, (1/3–)1/2 length of sepals; style pubescent at base. Young fruits densely velutinous, trichomes ferruginous or light red-brown; mature mericarps dumbbell-shaped (Fig. 2C), the wings ± attaching to the sides of fruit body only, externally drying white-yellow, but surface in part obscured by indumentum, densely velutinous over fruit body and abundantly villous on wings with trichomes 0.3–0.6 mm, ferruginous, internally drying with wings yellow-white and fruit body slightly darker with faint brown rays extending into wings, fruit body 3–4 mm high, wings 6–7 mm high, distance between highest points of 2 wings 8–10 mm, width of mericarp 12–15 mm, 3–3.5 × height of fruit body, width of fruit body 2–3 mm, 1/6–1/4 width of mericarp; seeds 2–2.2 × 1.5–1.75 mm, green-brown to brown.

Habitat and distribution. *Gouania croatii* is known from Panama, from the Canal Zone area, Colón and Darién (Fig. 6B), and Chocó, Colombia. It is found in wet disturbed forests, 0–100 m in elevation. Some specimen labels indicate collection in river flood plains (e.g., *S. Knapp & J. Mallet 3218*, *Whitefoord & Eddy 209*). Many of the collections were made on Barro Colorado Island, all except *Shattuck 523* in coves with high silt deposits (Croat, 1978).

IUCN Red List category. Assessed as Data Deficient (DD) by IUCN (2012) critieria, *Gouania croatii* is known from only 19 collections in Panama and Colombia. However, as this study concentrated on the North American species of the genus, it is possible that this species may be more common in northern South America. Assignment of conservation status should await further study.

Phenology. *Gouania croatii* has been collected in flower in November and December.

Etymology. The new species is named for Thomas Bernard Croat, MO curator (1938–), who suggested (Croat, 1978) that this entity might (with further study) be worthy of specific or varietal recognition.

Discussion. *Gouania croatii* is most similar to *G. polygama*, a species known from Mexico to South America and the West Indies. *Gouania croatii* differs from *G. polygama* by its pubescent mericarps (vs. nearly glabrous in *G. polygama*) and its stipules, the lower lobes of which are foliaceous and reniform versus the stipule lobes small and ovate or lanceolate and acute to acuminate or rarely oblong or subulate. They are difficult to separate in flower, as the stipules of both species tend to be lost early; *G. croatii* is in general more densely pubescent than *G. polygama*. Perhaps also of interest is the occurrence of *G. croatii* in areas with high silt accumulations. On Barro Colorado Island, all but one collection were made in coves with high silt accumulation, while specimens of *G. polygama* were found inland or on points. Nowicke (1971) treated *G. polygama* as a synonym of *G. lupuloides* (see discussion of *G. polygama* below), and cited the following specimens from Panama of the species here published as *G. croatii* under *G. lupuloides*: *Croat 7984*, *Shattuck 444*, and *Woodworth & Vestal 326*. Croat (1978) also treated *G. polygama* as a synonym of *G. lupuloides*, but suggested that two forms of the species were present on Barro Colorado Island, which, under further monographic study, might warrant varietal or specific recognition, and cited specimens for the form that he recognized as less common and more pubescent (*Croat 7274*, *7984*, *12699*, *12739*, *13482*; *Shattuck 290*, *444*, *523*; and *Woodworth & Vestal 326*). These represent the species described here and named in honor of Thomas Bernard Croat. Specimens from Colombia (Antioquia, Bolívar, Boyacá, Chocó), Venezuela (Falcón), Ecuador (Esmeraldas and Napo), and Peru (Amazonas) that are similar to *G. croatii* but with different stipules (upper lobe lanceolate and acuminate, lower lobe linear to subulate; e.g., *E. Forero et al. 5188*, MO, and *R. Vásquez et al. 18574*, MO) and different coloration pattern on the internal surface of the mericarp (drying light brown over the fruit body with well-developed brown rays extending into the wings, e.g., *E. Forero et al. 4173*, MO, and *W. Palacios 2449*, MO) are kept separate from *G. croatii*, pending further study.

Paratypes. PANAMA. **Canal Area:** Pipeline rd., 5–10 mi. N of Gamboa, *A. H. Gentry 2650* (GH, MICH, MO); Pipeline rd., 8 km NW of Gamboa, *M. Nee 8432* (GH, MO); Pipeline rd., 2.3 mi. from gate, *T. B. Croat 12739* (MO, NY); Barro Colorado Island, *O. E. Shattuck 290* (MO), *444* (MO), Zetek Trail, marker 247, *O. E. Shattuck 523* (F, MO), cove N of laboratory, *R. H. Woodworth & P. A. Vestal 326* (MO), Hydrilla Cove, *R. J. Schmalzel & T. M. Aide 106* (MEXU, MO, TEX), Fuertes Cove, *T. B. Croat 12699* (MO, NY), shoreline of cove N of dock, *T. B. Croat 7274* (F, MO, NY), shoreline S of large cove N of Burrunga Point, *T. B. Croat 7984* (MO), shoreline of large cove S of Orchid Island, *T. B. Croat 13482* (F, MO; Fig. 2C). **Colón:** Gatún, *S. Hayes 122* (NY). **Darién:** Río Cocalito, *C. Whitefoord & A. Eddy 209* (BM, MO); rd. betw. El Real & Pijibasal, *R. L. Hartman 12015* (MEXU, MO, TEX).

COLOMBIA. **Chocó:** Mpio. Riosucio, zona de Urabá, cerros del Cuchillo, sect. Cuchillo Negro, orilla quebrada Cedros, *D. Cárdenas 1174* (MO), sect. Cuchillo Blanco, *D. Cárdenas 2054* (MO).

4. Gouania ekmanii Alain, Contr. Ocas. Mus. Hist. Nat. Colegio "De La Salle" 12: 5. 1953. TYPE: Cuba. Pinar del Río: Mogote de la Baliza, Sra. de las Guacamayas, 8 Nov. 1923 [10 Aug. 1923, in protologue], *E. L. Ekman 17985* [*17895*, in protologue] (holotype, HAC [transfer from LS], HAC photo!, digital image!; isotypes, A!, F [packet only]!, NY [packet only]!). Figure 2D.

Liana; young branches solid, densely pilose, trichomes white to light red-brown. Leaf blades 4–5.5 × 2–2.8 cm, oblong, membranaceous to subcoriaceous, adaxial surface drying gray-green to dark green, scattered to densely puberulent with trichomes 0.05–0.1 mm, at right angles to surface, white, abaxial surface green-white, surface between venation totally covered with trichomes 0.05–0.1 mm, trichomes on venation to 0.25 mm, all trichomes straight, appressed and white, lateral veins 5 or 6 per side of midrib, diverging at ca. 60° angles, base cordate, margin serrate to serrulate, 2 to 4 teeth/cm, tooth glands pustular, apex obtuse to acute; stipules 2-lobed, at least some retained into young fruit, upper lobe 2.5–3.25 × 0.75–1.5 mm, erect, lanceolate, acuminate to long extended, flexuous tip, lower lobe 0.75–1 × 0.5 mm, curving downward, lanceolate, acuminate; petioles 5–13 mm. Inflorescence with longest racemiform part ca. 1 cm, rachis velutinous with trichomes white, bract of cyme ca. 2.25 mm, lanceolate, acuminate, cymes appearing sessile, mature flowers with pedicels ca. 1.25 mm, hypanthium and sepals externally densely velutinous with trichomes yellow-white; sepals ca. 0.75 mm; petals ca. 0.75 mm; stamens with filaments ca. 0.3 mm, anthers ca. 0.3 mm; disc excluding lobes ca. 1.25 mm diam., annulus with numerous trichomes, disc otherwise glabrous, disc lobes ca. 0.25 × 0.7 mm at apex, transversely rectangular, apically bilobed, 1/3 length of sepals; style glabrous. Young fruits not observed; mature mericarps butterfly-shaped (Fig. 2D), the wings attached to apex and base of fruit body as well as sides, externally drying with green to white wings and green fruit body, densely velutinous with trichomes 0.05–0.25 mm, white, internally drying with wings and fruit body a similar green-white, fruit body 4–5 mm high, wings ca. 6 mm high, distance between highest points of 2 wings 5–6 mm, width of mericarp 8–9 mm, ca. 2× height of fruit body, width of fruit body 2.75–3 mm, 1/4–1/3 width of mericarp; seeds 2.3–2.75 × 1.7–1.75 mm, shiny brown.

Iconography. Liogier (1953a: 6, fig. 6).

Habitat and distribution. *Gouania ekmanii* is endemic to the hills of Pinar del Río Province, Cuba. It has been collected on limestone and from 290 to 500 m in elevation (Fig. 8A).

IUCN Red List category. Assessed as Data Deficient (DD) by IUCN (2012) criteria, *Gouania ekmanii* is known from only four collections from Pinar del Río Province, Cuba. Further study is urged to determine if it is endangered or critically endangered.

Phenology. Only one flowering collection of *Gouania ekmanii* is known. The date on the label is 8 November 1923, but there is reason to question this (see discussion below).

Discussion. Liogier (1953a) cited the type of *Gouania ekmanii* as *Ekman 17895*, collected 10 Aug. 1923, with the holotype deposited at LS and an isotype at NY. Figure 6 (Liogier, 1953a: 6) was published as a photo of the holotype. The specimen described and depicted is in fruit. The LS herbarium was transferred to HAC, and I received from HAC a scanned image of the holotype, the fruiting specimen pictured in figure 6 of Liogier. The collection number of this specimen is *17985* (not *17895*) and the date is 8 Nov. 1923 (not 10 Aug. 1923). The specimen at A has the same collection number and date as the holotype and is clearly an isotype. The NY specimen of *E. L. Ekman 17985* has two labels, one on the sheet, dated 10 Aug. 1923, and another on the packet, dated 8 Nov. 1923; the material both on the sheet and in the packet is in fruit. The F sheet of *Ekman 17985* is in flower and has a label with the collection date 8 Nov. 1923; fruiting material is in a packet. The isotypes of *G. ekmanii* at F and NY are the specimens in the packets only. The flowering material was probably not collected at the same time as the fruiting material. It is likely that the original flowering collection was actually made on 10 Aug. 1923 and the fruiting collections on 8 Nov. 1923, and the labels misapplied. If this is correct, then the sheet at NY would also be an isotype.

Gouania ekmanii is most similar when in fruit to *G. eurycarpa*, but can be easily separated using the key to species; *G. eurycarpa* with the disc annulus glabrous, fruit body usually 6–9 mm high, mericarp 11–15 mm wide and the abaxial surface of the leaves with trichomes spreading, 0.2–0.6 mm long and not totally covering the surface. Specimens of *G. ekmanii* were identified by Urban as *G. polygama*, which has a different leaf pubescence, mericarps nearly glabrous and dumbbell-shaped, and flowers with the disc lobes often apically tapering and usually longer relative to sepals, (1/3–)2/5–3/5(–2/3). *Gouania hypoglauca* has leaf pubescence similar to that of

G. ekmanii but usually has fewer lateral veins (three or four) on either side of the blade midrib, the entire nonlobed part of the flowering disc pubescent, and larger mericarps (height of wings 9–14 mm, width of mericarp 10–15.3[17] mm).

Additional specimens examined. CUBA. **Pinar del Río:** Sierra del Ancón, Viñales, *Liogier 6862* (PR; Fig. 2D); Mogote de la Baliza, Sra. de las Guacamayas, *Ekman 17985* (NY); Sierra del Sitio Santo Tomas, Ensenada de Vega Cuchilla, *Ekman 16675* (BM, F).

5. Gouania eurycarpa Standl., Publ. Field Mus. Nat. Hist., Bot. Ser. 4: 315. 1929. TYPE: Honduras. Yoro: near Progreso, 30 m, 24 Jan. 1928, *P. C. Standley 54988* (holotype, F!; isotypes, A!, G fragm.!, US!). Figure 2E.

Liana; young branches generally hollow, densely to abundantly villous to pilose, trichomes white or light red-brown. Leaf blades 5–10.5 × 2.5–6.7 cm, elliptic or less frequently ovate, membranaceous, adaxial surface drying green, abundantly pubescent to glabrescent with trichomes 0.25–0.5 mm, appressed, ascending, straight to slightly curved, white to light red-brown, abaxial surface drying similar green to adaxial surface to slightly paler, abundantly to sparsely pubescent with trichomes 0.2–0.6 mm, spreading in all directions, straight or slightly curved, white or light red-brown, lateral veins 4 or 5(6) per side of midrib, diverging at 45°–75° angles, base generally subcordate to rounded (rarely cordate), margin serrate to serrulate (rarely crenate or crenulate), 1 to 2 teeth/cm, tooth glands pulvinate to cupular, apex acute to acuminate; stipules 2-lobed, usually retained through fruiting, upper lobe 3–6.5 × 0.75–1.5 mm, flexuous, lanceolate, acuminate, lower lobe 1–3.5 × 0.35–1 mm, spreading then curving up and/or down, lanceolate (rarely linear), acuminate; petioles 4–13(18) mm. Inflorescence with longest racemiform part 6.5–15 cm, indumentum of rachis similar to that of young branches, bract of cyme 2–5 mm, narrowly lanceolate to nearly linear, acuminate, cymes appearing sessile to peduncle 1 mm, mature flowers with pedicels 0.75–2 mm, hypanthium densely velutinous with trichomes yellow-white or sometimes mixed with light red-brown; sepals 0.75–1.2 mm, externally densely sericeous, trichomes yellow-white or mixed with light red-brown; petals 0.65–1.1 mm; stamens with filaments 0.5–1 mm, anthers 0.2–0.25 mm; disc excluding lobes 0.9–1.6(2) mm diam., glabrous, disc lobes 0.2–0.4 × 0.2–0.5 mm at apex, square to transversely rectangular, generally apically bilobed, 1/4–1/3 length of sepals; style glabrous. Young fruit densely velutinous, trichomes white to yellow or light red-brown; mature mericarps butterfly-shaped (Fig. 2E), the wings attached to apex and base of fruit body as well as sides, externally drying yellow-brown or green-yellow on wings and fruit body darker brown or brown-green, densely velutinous over fruit body to scattered pilose on wings with trichomes 0.2–1 mm, white and light red-brown, internally drying with wings yellow-white contrasting slightly with light gray-brown fruit body, fruit body (5)6–9 mm high, wings (6)8–11 mm high, distance between highest points of 2 wings 5–8 mm, width of mericarp 11–15 mm, 1.5–2× height of fruit body, width of fruit body 3–4 mm, 1/4–1/3 width of mericarp; seeds 3–3.75 × 2.2–2.75 mm, shiny brown.

Iconography. Krings and Braham (2005: 126, tab. 10.1, fig. C, c as *Gouania lupuloides*).

Distribution. *Gouania eurycarpa* is known from the Yucatan Peninsula (Belize, Guatemala [Petén], and Mexico [Campeche, Yucatán, Quintana Roo, and the border of Chiapas and Petén]) and the type from Atlantic Honduras. Collections are noted from sub-deciduous to sub-evergreen forest and from 0 to 520 m in elevation (Figs. 3, 5B).

IUCN Red List category. Assessed as Data Deficient (DD) by IUCN (2012) criteria, *Gouania eurycarpa* is endemic to relatively wet forests of the Yucatan Peninsula and Atlantic Honduras where it is known from 109 collections and has an estimated area of occupancy of 312 km². Studies should be conducted to determine what is restricting its distribution and what risks the species faces before determining its conservation status.

Phenology. *Gouania eurycarpa* has generally been collected in flower in October and November and, rarely, from December through April.

Discussion. *Gouania eurycarpa* is most similar to *G. ferruginea*, but the latter species is restricted to upper elevations (1500–2200 m) in the mountains of Guatemala and Honduras. The two species can be separated following the key to species (for further discussion see *G. ferruginea*). The specimen cited for Guatemala by Standley and Steyermark (1949) as *G. eurycarpa* (*Standley 59894*) is a fruiting collection of *G. ferruginea*, and no herbarium collections of true *G. eurycarpa* from Guatemala were known at the time of that publication. Without fruit, *G. eurycarpa* is very difficult to separate from the widespread and very variable *G. lupuloides*. However, even in very young fruit they can be separated by the sparsely pilose or sericeous fruits of *G. lupuloides* versus the densely velutinous fruits of *G. eurycarpa*, and in flower the

indumentum of the hypanthium of *G. lupuloides* is sericeous versus velutinous in *G. eurycarpa*. In addition, while abaxial leaf pubescence is variable in *G. lupuloides* throughout its geographic range, in the Yucatan Peninsula (where *G. eurycarpa* is primarily found) the trichomes of the actual surface (vs. those on the venation) are straight, appressed and ascending versus spreading in all directions in *G. eurycarpa*. In the Mexican states of the Yucatan Peninsula, the two species form an interesting distribution pattern, with *G. lupuloides* found toward the Gulf of Mexico side and *G. eurycarpa* on the Caribbean side. *Gouania eurycarpa* was not recognized in Balick et al. (2000) for Belize, but specimens of *G. eurycarpa* are cited under both species of *Gouania* that they do recognize, *G. lupuloides* (*Arvigo & Cocom 703*, *Balick et al. 2121*, and *Gentle 236*) and *G. polygama* (*Gentle 1081* and *Warrior 2325*). *Gouania polygama* is most easily separated from *G. eurycarpa* by its dumbbell-shaped, nearly glabrous mericarps and flowers with a ring of trichomes around the disc annulus. Occasionally, specimens of *G. eurycarpa* are misidentified as *G. rosei* (Pacific Mexico), but these can be easily separated using the key to species; *G. rosei* with smaller mericarps (6–9 mm wide, height of wings 4–6 mm), fruit body drying dark red-brown on internal surface, and the stipules caducous and unlobed. The name *G. eurycarpa* has often been misapplied to Costa Rican specimens of *G. velutina*, and the illustration in Krings and Braham (2005) labeled as *G. eurycarpa* (tab. 10.1, fig. A) and the voucher cited thereunder (*Berrocal & Sánchez 107*, MO) actually correspond to *G. velutina*; see discussion under *G. velutina*.

Selected specimens examined. BELIZE. s. loc., *Warrior 2325* (NY). **Cayo:** Caracol Maya Ruins, 14 km W of Las Cuevas, *Hawkins 1156* (MO); Chaa Creek, *Arvigo & Cocom 703* (GH, NY, TEX). **Corozal:** s. loc., *Gentle 236* (A, F, MICH, NY, US); San Andrés, *Gentle 1081* (A, F, K, MICH, MO, NY); Ranchito, *Balick et al. 2121* (GH, MO, NY, US). **Orange Walk:** Rio Bravo Conserv. & Managem. Area, *Brokaw & Schulze 194* (BM, MO). GUATEMALA. **Petén:** Tikal Nat. Park, Tikal, Temple V, *Lundell 15396* (DS, F, LL, NY), bordering airfield, *Lundell 15321* (CAS, F, LL), Group H, on top of temple, *Contreras 368* (DS, LL, MO), Tikal, *Cantrall 2* (MICH), camino para el Remate, Km. 59, *Tún Ortíz 447* (F, MO, NY); Lago Petén Itzá, der Strasse von San José nach Nuevo San José, *Wallnöfer 9483* (MO, MSB, NY); Lago Petén Itzá, 0.3 km W der Strasse von San José nach Nuevo San José, *Wallnöfer 9540* (K, MO, MSB, NY). MEXICO. **Campeche:** Tuxpeña, *Lundell 1030* (F, GH, MICH, MO, NY); Calakmul, a 0.8 km al O de la Zona Arqueol. Nadzcaan, *Álvarez & Abascal 2838* (MEXU); Calakmul, 34 km al S de la caseta de entrada a Calakmul, *Martínez S. et al. 29963* (MEXU, MO); Calakmul, 3 km al W de Eugenio Echeverria Castellot I, *Martínez S. et al. 29593* (MEXU, MO, TEX); Calakmul, 3 km al E de Ley de Fomento, *Martínez S. et al. 30105* (MEXU, MO); Calakmul, 2 km al SE de Dos Naciones, *Martínez S. et al. 29275* (MEXU, MO, TEX); Escárcega, 98 km E of Francisco, *Johnson & Conway 406-78* (MO); Hopelchén, 12 km al NW de Ucum, *Martínez S. et al. 29762* (MEXU); Hopelchén, al S de Xpujil, *Chan V. 4573* (MO; Fig. 2E). **Chiapas:** Ocosingo, 14 km al NW de Crucero Corozal, sobre el Camino Palenque Boca Lacantum, *Martínez S. 16674* (F, GH, MEXU, MO). **Quintana Roo:** 5 km beyond Valladolid Nueva, toward Puerto Juarez, *Schubert & Gómez Pompa 1632* (A, MEXU); en los alrededores de la Laguna Muyil, 20 km S de Tulum, *Cabrera C. & de Cabrera 3969* (MEXU, MO); en la brecha al antiguo aereopuerto de Cancún, *Cabrera C. & Ibarra Manríquez 1443* (BM, MEXU); Puerto Morelos, 2 km al N camino a granja porcícola, Benito Juárez, *Méndez & Durán 908* (MO); rancho sobre la carr. Cancún Tulum, *Moreno C. 462* (MEXU); Isla de Cozumel, Cozumel, 5 km N de la carr. transversal, *Cabrera C. & de Cabrera 9870* (MEXU, MO); Cozumel Island, vic. of San Miguel de Cozumel, *Lewis 6868* (MO, TEX); Felipe Carrillo Puerto, Mixtequilla, 2.5 km hacia Yocdzonot Poniente, *Balam 627* (F, MO); Othón P. Blanco, 0.5 km S de Nuevo Jerusalén, *Carnevali et al. 4980* (K). **Yucatán:** betw. Thul & Becanchen, *Darwin & White 2229* (F, MEXU, MO); Yaxcobá de Tixcacaltuyub, 13 km rumbo a Peto, *Simá 358* (MEXU).

6. Gouania ferruginea A. Pool, sp. nov. TYPE: Guatemala. Sacatepéquez: Antigua, San Mateo Milpas Altas, 1900 m, 14 Aug. 1992, *M. Véliz Pérez 92.2280* (holotype, MO!; isotypes, MEXU!, BIGU not seen). Figure 10A–E.

Diagnosis. New species similar to *Gouania eurycarpa* Standl., but with lateral leaf veins 7 or 8 per side of midrib, flowers and fruits drying dark ferruginous, and fruit body width 2/5 the width of the mericarp.

Liana; young branches solid, densely villous or velutinous, trichomes ferruginous. Leaf blades 5.5–10 × 4–7 cm, ovate or elliptic, membranaceous, adaxial surface drying dark red-brown or dark green, densely to scattered villous to sericeous with trichomes 0.25–0.6 mm, light brown, abaxial surface drying pale green or pale yellow, densely villous and tomentose with trichomes 0.5–1 mm, spreading and matted, all white, or red-brown on lateral veins, lateral veins 7 or 8 per side of midrib, diverging at ca. 45° angles, base cordate then shortly decurrent or truncate, margin serrate (rarely crenate), 1 to 3 teeth/cm, tooth glands pustular to cupular at maturity, apex acute or short-acuminate; stipules 2-lobed, at least some retained into young fruit, upper lobe 2–4.5 × 1–1.5 mm, erect, lanceolate, acuminate, lower lobe 2–3.5 × 0.5–1.25 mm, curving downward, lanceolate, acuminate; petioles 5–10 mm. Inflorescence with longest racemiform part 8.5–11 cm, indumentum of rachis similar to that of young branches, bract of cyme 2.5–3 mm, lanceolate, acuminate, cymes appearing sessile, mature flowers appearing sessile to pedicels to 0.75 mm, hypanthium densely villous

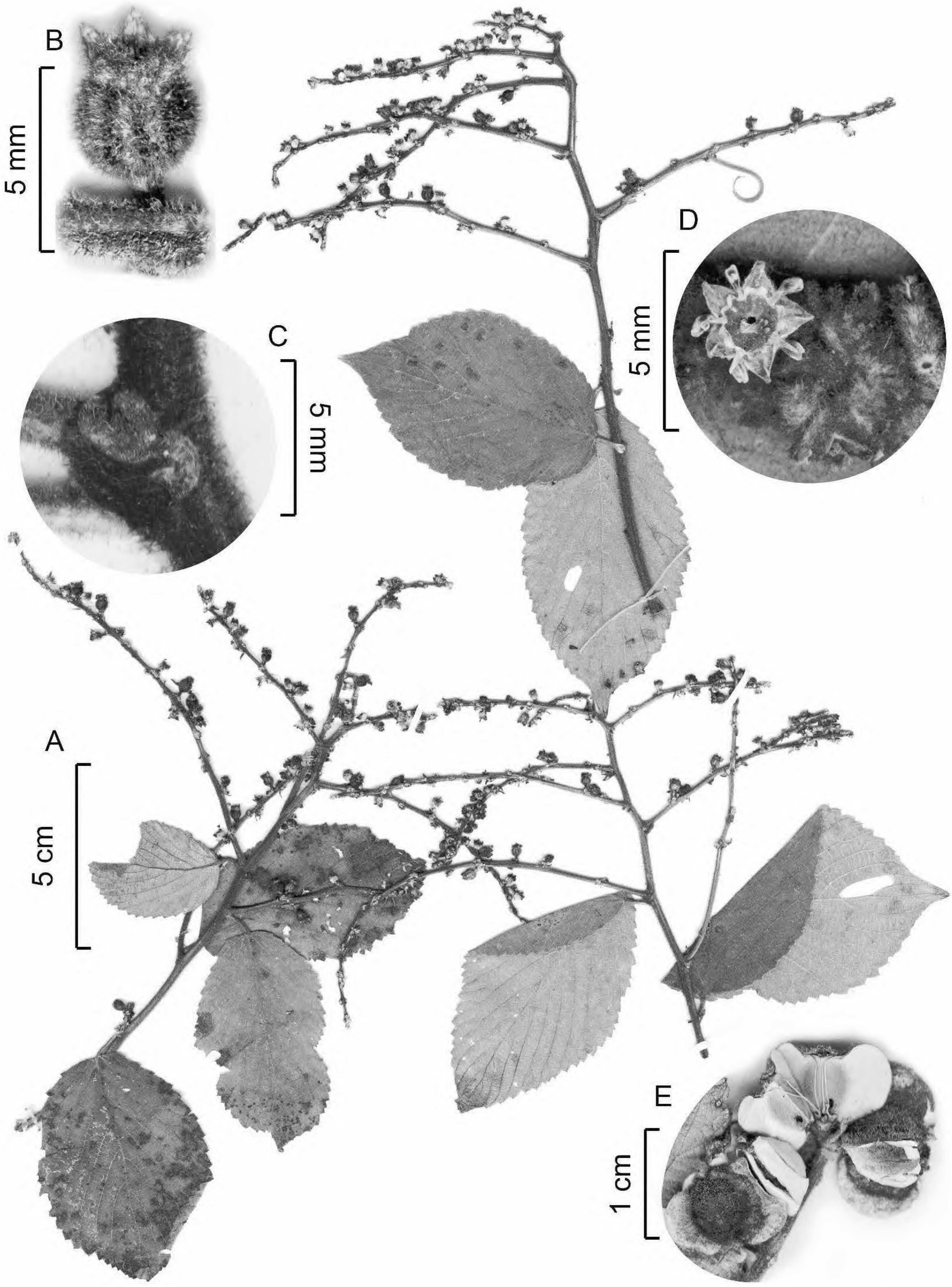


Figure 10. *Gouania ferruginea* A. Pool. —A. Three fertile branches with flowers and young developing fruits. —B. Young developing fruit. —C. Stem node with stipule. —D. Flower at inflorescence node. —E. Portion of infructescence with fruits. A–C scanned from the holotype *M. Véliz Pérez 92.2280* (MO); D scanned from the paratype *W. E. Harmon & J. D. Dwyer 2912* (MO); and E scanned from the paratype *P. C. Standley 59894* (F).

with trichomes ferruginous and white; sepals 0.9–1.25 mm, externally densely villous, trichomes ferruginous; petals 0.8–1.5 mm; stamens with filaments 0.35–0.7 mm, anthers 0.25–0.3 mm; disc excluding lobes 1.2–1.75 mm diam., glabrous, disc lobes ca. 0.25 × 0.5–1 mm at apex, transversely rectangular, generally apically bilobed, (1/5–)1/4 length of sepals; style pubescent at base. Young fruits densely velutinous, trichomes ferruginous or ferruginous and white; mature mericarps butterfly-shaped, the wings attached to apex and base of fruit body as well as sides, externally drying green but surface nearly totally obscured by indumentum, densely villous with trichomes ca. 0.25 mm, ferruginous, internally drying with wings yellow-white, contrasting only slightly with light brown fruit body, fruit body ca. 6.2 mm high, wings ca. 7.2 mm high, distance between highest points of 2 wings ca. 7 mm, width of mericarp ca. 12 mm, 2× height of fruit body, width of fruit body ca. 5 mm, 2/5 width of mericarp; seeds unknown.

Habitat and distribution. *Gouania ferruginea* is known from Guatemala (Baja Verapaz and Sacatepéquez) and Honduras (Ocotepeque). It is found in oak, pine-oak, or *Liquidambar* forest, at 1500–2200 m elevation (Fig. 5B).

IUCN Red List category. Assessed as Data Deficient (DD) by IUCN (2012) criteria, *Gouania ferruginea* is known from only 10 collections from upper elevations in the mountains of Guatemala and Honduras. It has an estimated extent of occupancy of about 14,000 km² and an estimated area of occupancy of 40 km². Population studies should be conducted to determine its conservation status.

Phenology. *Gouania ferruginea* has been collected in flower in July and August.

Discussion. *Gouania ferruginea* is most similar to *G. eurycarpa*, but *G. eurycarpa* is restricted to low elevations (0–520 m) of the Yucatan Peninsula and Atlantic Honduras. The two species can be separated following the key to species; *G. eurycarpa* has fewer lateral veins on either side of midrib (usually four or five, rarely six), flowers and fruits dry externally white or yellow to brown or light red-brown, and the width of the fruit body is one fourth to one third the width of the mericarp. Specimens of *G. ferruginea* have frequently been misidentified as *G. polygama*, which differs most markedly in its mericarps, nearly glabrous and dumbbell-shaped type (vs. densely villous and butterfly-shaped in *G. ferruginea*), and flowers with the disc lobes (1/3–)2/5–3/5(–2/3) the length of the sepals (vs. the disc lobes (1/5–)1/4 the length of the sepals) and the annulus with trichomes (vs. the entire disc glabrous). In flower, *G. ferruginea* can be similar to *G. conzattii* of central Mexico. However, *G. conzattii* often has the annulus with trichomes and the young developing fruit sparsely pilose to glabrescent.

Paratypes. GUATEMALA. **Baja Verapaz:** Santa Rosa, *P. C. Standley 91084* (F). **Sacatepéquez:** Volcán de Acatenango, *M. Véliz Pérez 94.4037* (MEXU), *14159* (MO); Antigua Guatemala, en la aldea San Mateo, *J. J. Castillo Mont & M. Véliz Pérez 2775* (NY); near Pastores, *P. C. Standley 59894* (F); 5 km S of Santa María de Jesús, *W. E. Harmon & J. D. Dwyer 2912* (GH, MO); Santiago Sacatepéquez, *R. Gómez 796* (GH). **San Marcos:** Quesiguán, *J. R. Johnston 1258* (F). HONDURAS. **Ocotepeque:** Sinuapa, 17 km NE of Nueva Ocotepeque, *W. E. Harmon & J. D. Dwyer 3788* (MO).

7. Gouania guiengolensis A. Pool, sp. nov. TYPE: Mexico. Oaxaca: Tehuantepec, ruinas del Cerro Guiengola, 450 m, 3 Sep. 1985, *M. L. Torres C., R. Torres C. & C. Martínez R. 134* (holotype, MEXU!; isotype, MO!). Figures 1B, 2F, 11A–D.

Diagnosis. New species similar to *Gouania rosei* Wiggins but with linear stipules, glabrous mericarps, and fruit body width 3/5 width of mericarp.

Liana; young branches solid, densely to sparsely pilose to sericeous, trichomes white to light red-brown. Leaf blades 4.5–10.2 × 2.5–5 cm, lanceolate to ovate, membranaceous, adaxial surface drying dark green to light green, sparsely pubescent, or glabrescent and trichomes retained only on venation with trichomes 0.25–0.5 mm, appressed, white, abaxial surface drying pale green, abundantly villous to pilose to glabrescent and trichomes retained only on venation with trichomes 0.2–0.5 mm, white, lateral veins 4 to 6 per side of midrib, diverging at 50°–70° angles, base cordate then shortly decurrent or truncate, margin serrate to serrulate or crenate to crenulate, 1 to 3 teeth/cm, tooth glands cupular, apex acute or acuminate; stipules unlobed (Fig. 1B), usually lost at anthesis, 5–9 × 0.5–0.75 mm, flexuous, linear; petioles 7–20 mm. Inflorescence with longest racemiform part 4–9 cm, rachis villous to sericeous with trichomes light red-brown, bract of cyme 1.75–5.5 mm, linear, cymes appearing sessile, mature flowers appearing sessile to pedicels to 1 mm, hypanthium densely villous to sericeous with trichomes yellow-white to white; sepals 0.7–1.1 mm, externally densely to sparsely villous to sericeous, trichomes yellow-white to white; petals 0.75–1.1 mm; stamens with filaments 0.5–0.8 mm, anthers 0.2–0.25 mm; disc excluding lobes 1–1.25 mm diam.,

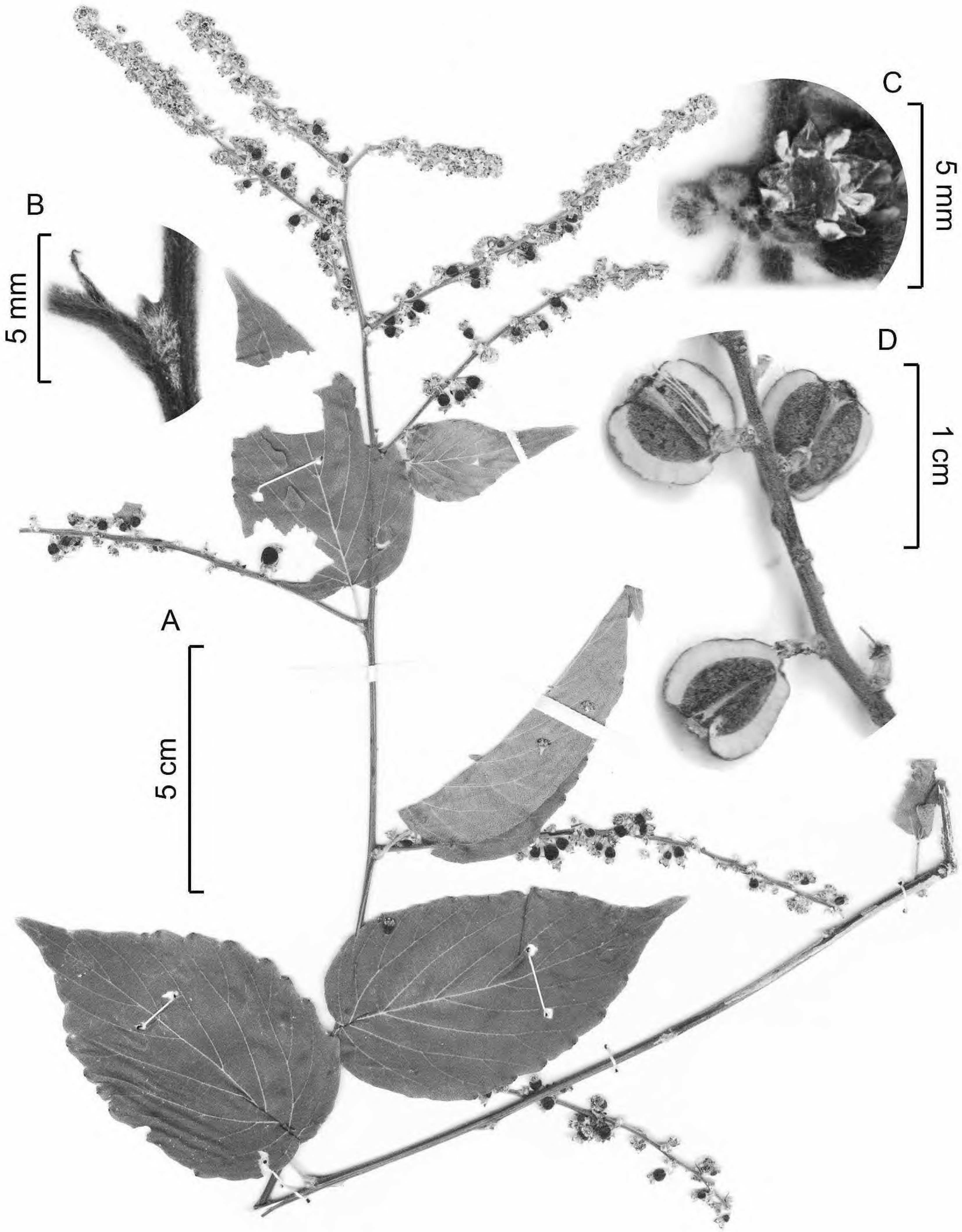


Figure 11. *Gouania guiengolensis* A. Pool. —A. Fertile branch with flowers and young developing fruits. —B. Stem node with stipule. —C. Flower at inflorescence node. —D. Portion of infructescence with open fruits. A scanned from the holotype *M. L. Torres C., R. Torres C. & C. Martínez R. 134* (MEXU); B, C scanned from the isotype *M. L. Torres C., R. Torres & C. Martínez R. 134* (MO); and D scanned from the paratype *M. L. Torres C. et al. 580* (MEXU).

annulus with numerous to few trichomes, disc otherwise glabrous, disc lobes ca. 0.2–0.4 × 0.35–0.5 mm at apex and transversely rectangular (rarely lanceolate and acuminate, *E. Matuda 586*), generally apically bilobed, 1/4–1/3(–1/2) length of sepals; style glabrous or pubescent at base. Young fruits sparsely pilose, trichomes white; mature mericarps butterfly-shaped (Fig. 2F), the wings attached to apex and base

of fruit body as well as sides, externally drying dark red-brown, glabrous or with few minute trichomes retained at apex of fruit body, internally drying yellow-white on wings strongly contrasting with dark red-brown fruit body, fruit body 5–6 mm high, wings 6–7.5 mm high, distance between highest points of 2 wings ca. 4 mm, width of mericarp 7–8 mm, 1–1.5× height of fruit body, width of fruit body 4–5 mm, 3/5 width of mericarp; seeds 3.5–4 × 2.5–3.5 mm, shiny brown.

Habitat and distribution. *Gouania guiengolensis* is known from the Pacific area of the Isthmus of Tehuantepec, Mexico (Oaxaca), with a number of collections from Cerro Guiengola. It is found in deciduous forests, often in secondary vegetation, at 30–720 m elevation (Fig. 4B).

Phenology. *Gouania guiengolensis* has been collected in flower from July to September.

IUCN Red List category. Assessed as Data Deficient (DD) by IUCN (2012) criteria, *Gouania guiengolensis* is known from 18 collections made from four different districts in the Pacific area of the Isthmus of Tehuantepec on and near Cerro Guiengola. Its estimated extent of occupany is ca. 7175 km^2 and the estimated area of occupancy is 56 km^2. As 93% of the collections fall outside of protected areas, it can be assumed that this species is either endangered or vulnerable; therefore further study is urgently called for.

Discussion. *Gouania guiengolensis* is most similar to the more widespread *G. rosei* (Pacific Mexico from Baja California and Sonora to the Tehuantepec District of Oaxaca). Both species have unlobed stipules, the abaxial surface of the leaves villous to pilose, flowers which at least sometimes (variable in *G. rosei*) have trichomes along the disc annulus and mericarps with the internal surface drying bicolored. They differ in the shape of the stipules, mericarp pubescence, and the ratio of the width of the fruit body to that of the mericarps. In *G. guiengolensis*, the stipules are linear, the mericarps glabrous, and the width of fruit body three fifths the width of mericarps; in *G. rosei*, the stipules are lanceolate, the mericarps densely pubescent, and the width of fruit body to one half that of the mericarps. The mericarps of *G. guiengolensis* are also a little higher, with the fruit body 5–6 mm (vs. 4–5 mm in *G. rosei*) and wings 6–7.5 mm (vs. 4–6 mm).

Most specimens of *Gouania guiengolensis* were previously identified as *G. lupuloides*, which differs in having bilobed stipules, with the upper lobe acuminate and lanceolate or triangular. In *G. lupuloides*, the flowers have the disc completely glabrous, the mericarps (8)9–16 mm wide and 1.5–3.2× the height of the fruit body, and the width of the fruit body (1/5)1/4–1/2 that of the mericarps, and mericarps drying nearly unicolored on the internal surface. One collection of *G. guiengolensis* (*Matuda 586*) is unusual in having the disc lobes lanceolate and acuminate and could be confused with *G. polygama*. It can be recognized as *G. guiengolensis* by its linear, unlobed stipules (Fig. 1B) and linear cyme bracts.

Paratypes. MEXICO. **Oaxaca:** 1 km al N de Ojo de Agua, *E. F. Cabrera C. & H. de Cabrera 7387* (MEXU); Distr. Juchitán, Mpio. Asunción Ixtaltepec, Cerro Timbón, *A. Saynes V. & A. Sánchez M. 3461* (MEXU), a 1 km en línea recta al NE (32°) de Nizanda, *C. Gallardo H. et al. 1525* (MEXU), cercanas a la vía del tren Transístmico, *E. A. Pérez G. & B. Reyes D. 1604* (MEXU, MO), Cerro Verde, *E. A. Pérez G. 1799* (MO); Distr. Juchitán, Ruta 185, la Ventosa a Matías Romero, *D. H. Lorence & R. Cedillo T. 3040* (F); Distr. Pochutla, Mpio. San Miguel del Puerto, Majahual, *M. Elorsa C. 642* (MEXU, TEX), Zimatán, 3 km LR N del puente, por el Chorro, *S. H. Salas M. & E. M. Martínez S. 2136* (MEXU), Zimatán, 4.5 km N del puente, por la brecha a Xadani, *S. H. Salas M. et al. 1843* (MEXU, MO); Distr. Tehuantepec, Tehuantepec, *E. Matuda 586* (MEXU, MICH, MO; Fig. 1B), Rincón Bamba a Garrapatero, Rincón Bamba, *C. Martínez R. 1813* (F, MEXU, MO, NY, TEX), Mpio. Salina Cruz, Cerro Marimba, entrando por Rincón Bamba, *C. Martínez R. 1024* (F, MEXU, MO, NY, TEX), 10 km al W de la Chiviza, camino a Lachiguiri, *R. Torres C. & C. Martínez R. 5739* (MEXU); Distr. Tehuantepec, Ruinas del Cerro Guiengola, *M. L. Torres C. et al. 580* (MEXU, MO; Fig. 2F), ladera S, *M. L. Torres C. et al. 689* (MEXU, MO), ladera O, entrando por el Mármol, "Arroyo de Piedra," *M. L. Torres C. et al. 238* (MEXU, MO), ladera S, *M. L. Torres C. et al. 180* (MEXU, MO).

8. Gouania hypoglauca Standl., Publ. Field Mus. Nat. Hist., Bot. Ser. 22: 89. 1940. TYPE: Costa Rica. Alajuela, Cantón de San Carlos, Villa Quesada, edge of Caribbean rain forest, 14 Apr. 1939, *A. Smith F1952* (holotype, F!; isotypes, MO!, NY!, US!). Figure 2G.

Liana; young branches hollow or solid, densely tomentose, trichomes ferruginous. Leaf blades 3.7–12 × 2.5–5.6 cm, ovate or elliptic, membranaceous to subcoriaceous, adaxial surface drying dark brown or black, abundantly to sparsely pubescent or trichomes often restricted to venation, glabrous with age, with trichomes 0.2–0.75 mm, ± straight and appressed, white, abaxial surface drying gray, yellow-gray or grayish yellow-green, surface between venation totally covered with trichomes 0.05–0.1 mm (sometimes glabrescent with trichomes retained only at base in older leaves), and on venation to 0.25 mm, all trichomes straight and appressed, all white, or red-

brown on venation, lateral veins (2)3 or 4(5) per side of midrib, diverging at 60°–75° angles, base rounded or rounded then shortly decurrent to obtuse (rarely cordate to subcordate), margin crenulate to nearly entire, 1 tooth/cm, tooth glands shallowly to deeply cupular (rarely pulvinate), apex short-acuminate; stipules unlobed or with small foot, caducous, 1–3.5 × 0.5–1.5 mm, erect, usually tightly appressed to branch (less frequently upward spreading), triangular to narrowly triangular, acuminate, foot (if present) 0.25–1 × 0.2–0.5 mm, curving downward, subulate; petioles 5–15 mm. Inflorescence with longest racemiform part 9–21 cm, rachis tomentose with trichomes white or ferruginous or pilose with trichomes ferruginous, bract of cyme 1–2 mm, subulate to triangular, acuminate, cymes appearing sessile, mature flowers appearing sessile to pedicels to 0.25(0.75) mm, hypanthium and sepals externally tomentose or sericeous with trichomes white or green-white, sometimes mixed with ferruginous; sepals 0.6–1.1 mm; petals 0.7–1.25 mm; stamens with filaments 0.5–0.75 mm, anthers 0.2–0.25 mm; disc excluding lobes 1–1.9 mm diam., with numerous trichomes along annulus and most of disc excluding, or often including, lobes rarely pubescent only along annulus (*Webster & Dressler 16722*) or along annulus and extending by rays onto disc (*de Nevers 5803*), disc lobes 0.1–0.3(0.5) mm × 0.3–0.75 mm at apex, transversely rectangular, generally apically bilobed, 1/6–1/3 length of sepals (rarely oblong and 1/2 length of sepals, *de Nevers 5803*, *Mori & Bolten 7106*); style pubescent. Young fruits densely to abundantly velutinous to tomentose and villous, trichomes ferruginous or white; mature mericarps butterfly-shaped (Fig. 2G), the wings attached to apex and base of fruit body as well as sides, externally drying dark brown or lighter on wings, abundantly tomentose with trichomes 0.05–0.25 mm, white to ferruginous, internally drying yellow-white on wings, not, or only slightly, contrasting with very light brown fruit body, fruit body 6–12 mm high, wings 9–14 mm high, distance between highest points of 2 wings 4–7(10) mm, width of mericarp 10–15.3(17) mm, 1.5–2× height of fruit body, width of fruit body 3.5–5 mm, 1/4–1/2 width of mericarp; seeds 3.25–4.5 × 2.25–3.5 mm, shiny brown.

Iconography. Krings and Braham (2005: 126, tab. 10.1, fig. B).

Habitat and distribution. *Gouania hypoglauca* is known from southeast Nicaragua, Costa Rica, and Panama. It is found in wet to very wet evergreen forests, between 0 and 1000 (rarely to 1400) m elevation (Fig. 6B).

IUCN Red List category. Assessed as Data Deficient (DD) by IUCN (2012) criteria, *Gouania hypoglauca* is known from 58 collections made in wet to very wet forests of southeastern Nicaragua to central Panama. It has an estimated area of occupancy of ca. 192 km². Further studies need to be conducted to estimate its conservation risks.

Phenology. *Gouania hypoglauca* has been collected in flower from May to September.

Discussion. The dense covering of the abaxial leaf surfaces with minute, appressed trichomes distinguishes *Gouania hypoglauca* from all other Central American species. It is most similar to *G. discolor* Benth. (of Amazonian South America: Brazil, Colombia, Guyana, and Venezuela) that differs in the flowers having longer pedicels, (1.5)2.5–3 mm, the disc trichomes usually restricted to the annulus (rarely extending by rays onto disc), the disc lobes one half to three fourths the length of the sepals, and usually lanceolate, acuminate, and the inner surface of the mericarps with numerous, dark red-brown rays extending from the fruit body onto the wings. Several specimens of *G. hypoglauca* from Panama approach *G. discolor*, namely *Webster & Dressler 16722* (with trichomes of disc restricted to annulus), *de Nevers 5803* (trichomes along annulus extending by rays onto disc and disc lobes 1/2 the length of the sepals) and *Mori & Bolten 7106* (disc lobes 1/2 the length of the sepals).

Additional specimens examined. COSTA RICA. **Alajuela:** Zapote de Alfaro Ruz [Ruiz], finka [finca] los Ensagos [Ensayos], *Barquero M. s.n.* [Aug. 1969] (NY, US); San Ramón, 2–3 km NW of Bajo Rodríguez, *Utley & Utley 5138* (F, MICH, MO); Upala, P. N. Guanacaste, Cordillera de Guanacaste, Est. San Ramón, Dos Ríos, *Espinoza 801* (CAS, MO); Upala, C. B. Guanacaste-Rincón de la Vieja, Cuenca del Pizote, San Cristóbal, *Quesada 476* (MO); Zarcero, ca. 8 mi. S of Quesada, *Webster et al. 12211* (TEX). **Guanacaste:** P. N. Rincón de la Vieja, Sendero a San Jorge, *Rivera 1366* (MO); Volcán Miravalles, trail SE lower slopes near Río Naranjo, *Wilbur & Almeda 16620* (F), *16664* (CAS, F, LL, MICH, MO); La Cruz, P. N. Guanacaste, Volcán Orosí, Est. Pitilla, *Moraga 924* (MO); Liberia, Rincón de la Vieja, *Barringer et al. 4059* (F, MO, TEX); Tilarán, P. N. Volcán Tenorio, Cuenca del San Carlos, Sect. Nevera, *Chaves 539* (G, MO, NY). **Heredia:** 3 mi. S of Cariblanco, *Croat 35776a* (MO); P. N. Braulio Carrillo, Est. Magsasay, Sarapiquí, *Acevedo 92* (MO); Sarapiquí, Cuenca del Sarapiquí, Finca Aracuak, Río Frío, *Kriebel 736* (MO); La Selva Biol. Stat., *Chacón G. 964* (F, MO), *Jacobs 2068* (MO), *Smith 251* (CAS, F, MICH, MO), *Sperry 742* (F, LL), *Vargas 1790* (MO), Río Puerto Viejo just E of jct. w/ Río Sarapiquí, *Smith 1091* (CAS, F, MO). **Limón:** Parque Tortuguero, Est. Agua Fría, *Robles 1127* (BM, F, MO, NY, TEX); vic. U.S. Dept. Agric. Rubber Exp. Stat., Los Diamantes, *Holm & Iltis 338* (BM, F, NY); Livingston on Reventazon, Bonilla, Llanura de Santa Clara along Río

Reventazón, *Rowlee & Stork 688* (NY), *719* (NY, US); Pococí, R. N. F. S. Barra del Colorado, Llanura de Tortuguero, Sardinas, *Araya 52* (MO); Pococí, R. N. F. S., Barra del Colorado, Llanura de Tortuguero, Puerto Lindo, *Araya & Corrales 795* (MEXU, MO); Talamanca, R. N. V. S., Gandoca-Manzanillo, faja costeña de Limón, Manzanillo, *Rodríguez G. 542* (MO); Talamanca, Bri brí, 7 km NO del pueblo, *Cascante 546* (F, K). **Puntarenas:** Golfito, P. N. Corcovado, Valle de Coto Colorado, Est. Esquinas, secc. Esquinas, *Aguilar 3276* (MO); Golfito, entre Golfito y Villa Briceño, *Hammel 18513* (MO); Golfito, Res. For. Gulfo Dulce, entre Rancho Quemado y Drake, *Aguilar et al. 116* (MO); Res. For. Golfo Dulce, Aguabuena sect. cuenca norte, *Aguilar 585* (MO); Osa, R. F. Golfo Dulce, de Rancho Quemado a Drake, *Hammel 21057* (G); Osa, R. F. Golfo Dulce, Bahía Chal, Los Mogos, *Ramírez & Morales 332* (MO); Osa, camino de Altura, 2–5 mi. W Rincón de Osa, *Raven 21503* (MO). **San José:** Tarrazú, Los Llanos de Santa María, Filas Las Rejas, *Valverde et al. 83* (K); Tarrazú, Faja Costeña del Valle de Parrita, *Vargas 464* (MO). NICARAGUA. **Atlántico Sur:** camino entre San Antonio y San Martín, *Araquistain 3140* (MO); 3 km E de La Esperanza, *Araquistain 3169* (MO, TEX); Monkey Point, Caño El Pato, *Moreno 12469-a* (MO), *Moreno 12408* (MO; Fig. 2G); a lo largo del Río Punta Gorda, entre el poblado de Nueva Atlanta y la desembocadura del mismo, *Rueda et al. 3083* (MO). **Río San Juan:** Buena Vista, 1 km W de Delta del Río San Juan, *Martínez S. & Riviere 2074* (F); Mpio. El Castillo, commun. Filas Verdes, de la casa de Juan Mayorga, *Jirón 25* (MO); Sábalo, 1 km al N de Río San Juan, *Moreno 26087* (MO); en el trecho entre San Juan del Norte y La Casa de Ramón Castillo, sobre el Caño San Juanillo, *Rueda et al. 1758* (MO); sobre el Río Indio, entre San Juan del Norte Nuevo y La Casa de Narciso Orozco, *Rueda et al. 1585* (MO); Res. Indio-Maíz, Mpio. San Juan del Norte, *Rueda et al. 4654* (MO). PANAMA. Western Panama, *Stork 34* (US). **Bocas del Toro:** 4–6 mi. N of Almirante, *McDaniel 5103* (MO); Changuinola, *Dunlap 235* (F, NY, US). **Coclé:** El Valle, behind Pensión, *Ebinger 961* (MO). **Colón:** Santa Rita Ridge, 2–3 mi. from Transisthmian Hwy., *Gentry 1864* (MO, US); al E de la zona montañosa de Santa Rita, *Correa A. & Dressler 986* (MO, NY, US); Santa Rita Ridge, rd. to Est. Calibrar Lluvia el Agua Clara, *Webster & Dressler 16722* (LL). **Panamá:** vic. Cerro Jefe, *McPherson 9993* (MO); Chepo, El Llano–Cartí rd., 9–12 km from Panamerican Hwy., *D'Arcy 10634* (MO); Cerro Azul area, 22 km from Pan American Hwy., *Mori & Bolten 7106* (MO). **San Blas:** El Llano–Cartí rd., betw. Río Pingandí & Río Cartí Grande, *de Nevers 5803* (MO, NY, TEX, US).

9. Gouania lupuloides (L.) Urb., Symb. Antill. 4: 378. 1910. Basionym: *Banisteria lupuloides* L., Sp. Pl. 1: 427. 1753. *Gouania domingensis* L., Sp. Pl. (ed. 2), 2: 1663. 1763. *Lupulus lupuloides* (L.) Kuntze, Revis. Gen. Pl. 1: 119. 1891, as "*lupulodes*." *Lupulus lupuloides* var. *domingensis* (L.) Kuntze, Revis. Gen. 1: 119. 1891. TYPE: tab. 201, fig. 4 in Plukenet, Phytographia, 3. 1692 (lectotype, designated here, Plukenet, tab. 201, fig. 4. in Plukenet, 1692!). EPITYPE: Barbados. Kendal Gully, 24 Mar. 1937, *A. E. S. McIntosh 333* (epitype, designated here, K!). Figures 1C–G, 2H.

Rhamnus domingensis Jacq., Enum. Syst. Pl. 17. 1760. *Gouania glabra* Jacq., Select. Stirp. Amer. Hist. 264. 1763. TYPE: tab. 179, fig. 40 in Jacq., Select. Stirp. Amer. Hist. 1763 (neotype [for *Rhamnus domingensis*] and lectotype [for *Gouania glabra*], both equivalent names) designated here, Jacquin, tab. 179, fig. 40 in Jacquin, 1763!).

Gouania cyclocarpa Sm. in Rees, Cycl. 16 (II). *Gouania* No. 3. 1819 [1811], syn. nov. TYPE: West Indies? s. loc., s.d., s. coll., "*Gouania cyclocarpa n. 3, Sm. in Rees Cycl.*" (holotype, Smith Herbarium LINN not seen, microfiche 1595 no. 3!).

Gouania pubescens Poir. var. *martinicensis* Poir., Encycl., Suppl. 2, 820. 1811 [1812], as "[var.]? Gouania (martinicensis)," syn. nov. TYPE: tab. 845, fig. 1, h and i in Lam., Tabl. Encycl. 1793 [1799] (lectotype, designated here, Lamarck, tab. 845, fig. 1, h and i in Lamarck, 1793 [1799]!).

Gouania glabriuscula Stokes, Bot. Mat. Med. 1: 436. 1812. TYPE: Jamaica, s. loc., s.d., *W. Wright s.n.* (lecotype, designated here, NY!; isolectotypes, GH!, K!).

Gouania lupuloides var. *aptera* Urb., Symb. Antill. 4: 378. 1910, syn. nov. TYPE: Puerto Rico. "Inter Coamo et Aibonito ad viam," 4 Nov. 1885, *P. Sintenis 1960* (lectotype, designated here, US!; isolectotypes, BM!, GH!, K!).

Gouania viridis Brandegee, Univ. Calif. Publ. Bot. 6: 501. 1919. TYPE: Mexico. Veracruz: Zacuapan, Oct. 1917, *C. A. Purpus 8032* (holotype, UC not seen, digital image!; isotypes, GH!, MO!, NY!, US!).

Gouania lupuloides var. *parvifolia* Hadač, Folia Geobot. Phytotax. 5: 431. 1970, syn. nov. TYPE: Cuba. Las Villas: Playa Larga, 0.5 km ad boreum a balneis, 22 Dec. 1967, *E. Hadač 838* (holotype, PR!).

Liana; young branches solid or hollow, densely to sparsely pilose or sericeous (rarely tomentose), trichomes white or red-brown. Leaf blades 4–13.2 × 2–8(9.2) cm, elliptic to ovate or lanceolate, membranaceous, adaxial surface drying green or less frequently brown-green (rarely red-brown), abundantly pubescent to glabrescent, sometimes trichomes only on venation, with trichomes 0.2–1 mm, usually appressed, straight and ascending, sometimes some or all spreading, slightly curved or kinky but still appressed, white or yellow-white (rarely red-brown), abaxial surface drying similar color to adaxial surface to slightly paler, densely pubescent to glabrescent, sometimes trichomes only on venation, with trichomes 0.15–1 mm, appressed, straight and ascending, or some or all somewhat curving or kinky or straight and spreading in all directions including erect, overall or only on veins or vein axils, white or yellow-white (rarely red-brown), lateral veins (3)4 or 5, or less frequently 6 per side of midrib, diverging at 45°–60°(70°) angles, base subcordate, rounded or cordate and then usually shortly decurrent, margin serrate to serrulate to nearly entire, irregularly serrate or 1 to 3(4) teeth/cm, tooth glands cupular (rarely pulvinate), apex acuminate or cuspidate (rarely acute); stipules 2-

lobed, usually retained (at least in part) into fruiting upper lobe 1–10 × 0.5–3 mm, curving upward or erect, lanceolate, acuminate and the tip long extended and flexuous (Fig. 1D–G) or triangular, acuminate, firm (Fig. 1C), lower lobe 0.1–14 mm, curving downward or spreading, lanceolate, acuminate (Fig. 1D), linear, subulate (Fig. 1C), oblong, or foliaceous and ovate (Fig. 1E), circular, broadly rectangular, or reniform, sometimes with long-extended glandular tip or with 2 or 3 short (Fig. 1F) to long-extended glandular teeth (Fig. 1G); petioles 3–26 mm. Inflorescence with longest racemiform part 7–25 cm, rachis sparsely to densely pilose or tomentose with trichomes white or yellow-white, or red-brown, bract of cyme 1.2–4(–7) mm, lanceolate, acuminate, cymes appearing sessile (rarely peduncle to 1.5 mm), mature flowers with pedicels (0.5–)1–3(–4) mm, hypanthium sparsely to densely sericeous (rarely tomentose) with trichomes white, yellow-white or light red-brown to ferruginous; sepals (0.5–)0.75–1.6 mm, externally sparsely to abundantly sericeous, trichomes white, yellow-white or light red-brown to ferruginous; petals (0.5–)0.6–1.5 mm; stamens with filaments (0.25–)0.3–1.2 mm, anthers (0.15–)0.2–0.3 mm; disc excluding lobes 1–1.8(–2.1) mm diam., glabrous, disc lobes (0.1–)0.2–0.5 × (0.1–)0.2–0.75 mm at apex, square to transversely rectangular (rarely longer than wide and narrowing apically, very rarely to point), generally apically bilobed, 1/5–2/5(1/2) length of sepals; style glabrous (rarely with trichomes). Young fruits glabrescent to sparsely pilose or sericeous, trichomes white to light red-brown; mature mericarps butterfly-shaped (Fig. 2H), the wings attached to apex and base of fruit body as well as sides, externally drying yellow-brown, green-brown, red-brown, or yellow, darker brown over fruit body, glabrous or apically sparsely and minutely pilose, puberulent, or sericeous with trichomes 0.1–0.3 mm, white, internally drying off-white on wings, slightly or moderately contrasting with slightly darker off-white to beige fruit body, fruit body 4–7 mm high, wings (5)6.6–12 mm high, distance between highest points of 2 wings 3–7 mm, width of mericarp (8)9–16 mm, 1.5–3.2× height of fruit body, width of fruit body 3–4.5(5) mm, (1/5)1/4–1/2 width of mericarp; seeds 2.7–3.8 × (1.5)2–3 mm, shiny brown.

Iconography. Krings and Braham (2005: 126, tab. 10.1, fig. C, a, b, excluding c); Acevedo-Rodríguez (2003: 364, tab. 144, fig. A–H); Liogier (1994: 83, tab. 71-3); Bornstein (1989: 163, tab. 69, fig. b, excluding a); Liogier (1982: 62, tab. 13, fig. A, B, excluding C).

Habitat and distribution. *Gouania lupuloides* is known from the southeastern United States (Florida), from northern Mexico to northern Panama, and in the Caribbean basin from the Bahamas, Greater Antilles, Leeward Islands, Windward Islands, and Barbados. It is most commonly found in dry vegetation, collected from roadside thickets, cinder slopes with low shrubs, pasture on mesa with basalt outcrops, dry forest, oak forest, scrub forest on limestone, sub-deciduous or deciduous forest, open oak woodland, as well as pine and oak forest, but is also on occasion noted in moist, sub-evergreen or evergreen forests, from 0 to 1700 (rarely to 2300) m elevation (Figs. 3, 7A, 8A).

IUCN Red List category. Assessed as Least Concern (LC) by IUCN (2012) criteria, *Gouania lupuloides* is very common in a variety of habitats from coastal Florida and northern Mexico to northern Panama and throughout the islands of the Caribbean region.

Phenology. *Gouania lupuloides* has been collected in flower from August to February (rarely March to May or July).

Discussion. Linnaeus published *Banisteria lupuloides* (the basionym of *Gouania lupuloides*) in 1753, making it the name with the earliest priority in the genus *Gouania*. As such, the name *G. lupuloides* has been frequently misapplied to a wide variety of distinct species. *Gouania lupuloides* and its synonyms are typified here to aid in the correct applications of these names.

Linnaeus (1753: 427) cited for *Banisteria lupuloides* the following: "Paullinia foliis simplicibus lanceolatis serratis *Hort. Ups. 9*; Lupulus sylvestris Americana claviculis donata. *Pluk. alm. 229. t. 201. f. 4. & t. 163. f. 3. Habitat in Barbados*." Linnaeus in Hortus Upsaliensis (1748: 97) also cited the Plukenet plates, the second as "*162, f. 3*." Material available for lectotype selection consisted of the specimen at the Linnaean herbarium (1226.1, LINN) labeled in Smith's hand "*Gouania domingensis/glabra*" and in Linnaeus' hand "HU 1," the two Plukenet figures, and the specimens in Herb. Sloane 95: 197 and 99: 205 (both associated with Plukenet tab. 162, fig. 3) and 96: 158 (associated with Plukenet tab. 201, fig. 4). All the specimens are sterile, as is Plukenet tab. 162, fig. 3, while Plukenet tab. 201, fig. 4 includes a mericarp, and is therefore chosen as the lectotype. The mericarp illustrated is butterfly-shaped and the leaves illustrated have five lateral veins on either side of the midrib, both characteristics associated with *G. lupuloides*. To further clarify the application of this name, a specimen collected in Barbados, *A. E. S.*

McIntosh 333 (K), was selected as an epitype. This specimen has characteristics typical for the species: butterfly-shaped mericarps, leaves with five lateral veins per side of the midrib, and retained stipules. *Gouania lupuloides* is the only species of *Gouania* known from Barbados (Table 4).

The publication of *Gouania domingensis* L. (Linnaeus, 1763) included all the original elements cited for *Banisteria lupuloides* (note, the second Plukenet tableau mistakenly cited as 63 vs. 163 in 1753 and 162 in 1748), but this name is probably not technically superfluous as *B. lupuloides*, in 1763, had no holotype, syntypes, designated lectotype, or conserved type, and the name itself (*B. lupuloides*) was not specifically cited by Linnaeus (1763) (see Art. 52.2, ex. 12, McNeill et al., 2012). However, the name *B. lupuloides* is indirectly referred to by Linnaeus (1763) including in his phrase name "*Banisteria*" and citing the place of publication with the page number of *B. lupuloides*. The lectotype (Plukenet tab. 201, fig. 4) and epitype (*A. E. S. McIntosh 333*, K) chosen above for *B. lupuloides* are here also selected for *G. domingensis* L.

Jacquin (1760) published two species of *Rhamnus* without indication of types and with identical short descriptions, except that *R. polygama* was described as having tomentose leaves and *R. domingensis* as having glabrous leaves. Subsequently, Jacquin (1763) published the new genus *Gouania* with two species (*G. tomentosa* and *G. glabra*), noting their previous treatment in the genus *Rhamnus*, the one described with glabrous leaves, *G. glabra*, equivalent to (but not superfluous for) *R. domingensis*, as this name was not explicitly cited in Jacquin, 1763 (see Art. 52.2, McNeill et al., 2012). The locality of *G. glabra* is cited as "sylvaticis Domingensibus" (Jacquin, 1763: 264) and a plate provided, consisting of one leaf with five lateral veins on each side of the midrib, one fruit, a mericarp of the butterfly-shape, and a seed. As no Jacquin specimens of *R. domingensis/G. glabra* were found in this study (or by Urban, 1921), and as Bornstein (1989) suggests that a type specimen is not extant, the plate is chosen as the neotype of *R. domingensis* and lectotype of *G. glabra*. The illustration of the mericarp and number of blade lateral veins supports placement of these names in synonymy of *G. lupuloides*, following Urban (1910).

Smith (1819 [1811]) published *Gouania cyclocarpa* based on a specimen in his herbarium. The place of collection is cited by Smith (1819 [1811]) as from the West Indies with uncertainty. The fruits of the specimen are young, but the mericarps seem to be of the butterfly shape and the mature leaves are described as glabrous. Assuming this is from the West Indies, it is *G. lupuloides*.

Poiret (1811 [1812]: 820) published *Gouania pubescens* with a type variety (from "Saint-Domingue") and a second variety, *G. pubescens* var. *martinicensis* (from Martinique). See discussion below *G. polygama* for the placement of *G. pubescens* var. *pubescens*. Poiret (1811 [1812]) separated *G. pubescens* var. *martinicensis* from the typical variety based on its subglabrous leaves, and cited a specimen from Martinique at Herb. Desfont. For the species, he cited a plate in Lamarck, 1793 [1799] (tab. 845, fig. 1). There is no specimen labeled with the name *G. pubescens* var. *martinicensis* in the microfiche collection at P-LA, nor was a specimen found when requested from FI. The plate cited represents two different species, with the flowering specimen (1799: tab. 845, fig. 1 a–g) being *G. polygama*, while the close-ups of the fruit depicted before (1799: tab. 845, fig. 1 i) and after the mericarps have separated (1799: tab. 845, fig. 1 h) correspond to *G. lupuloides*. As *G. lupuloides* is the only species of *Gouania* known from Martinique (Table 4), and as figures i and h are of *G. lupuloides* and no specimens of *G. pubescens* var. *martinicensis* can be found, these figures are chosen as the lectotype of *G. pubescens* var. *martinicensis*, which is also placed in synonymy under *G. lupuloides*. This variety was treated by Suessenguth (1953a: 170, as *G.* "*martinicensis*") as a synonym of *G. polygama*.

Stokes published *Gouania glabriuscula* in 1812 based on a Dr. Wright collection from Jamaica in young fruit. I have seen no collections labeled *G. glabriuscula*, and have not been able to find the Stokes herbarium, which, in 1856, was auctioned by Sotheby and is now untraceable as such (Kent & Allen, 1984). However, I have seen a number of specimens with young fruit labeled "Jamaica, Dr. Wright, Herb. Forsyth., Purchased 1835," and these are assumed to be isotypes. They are all *G. lupuloides*, which is the only species of *Gouania* known from Jamaica. The Dr. Wright is William Wright, not Charles Wright, who did not collect in Jamaica. All are mounted on the same sheet as other specimens that cannot be the type. On the GH sheet, the type of *G. glabriuscula* is only the thyrse mounted on the far left side of the sheet. On the same sheet are two specimens of *G. polygama*, both in young fruit, collected by C. Wright in Cuba. On the K sheet, the type material is in the center; to the left is a flowering collection by W. Wright from Jamaica, and on the right a specimen from St. Lucia collected by A. Anderson; all three are *G. lupuloides*. On the NY sheet, the type is on the left; the specimen on the

right (also *G. lupuloides*) was collected on St. Vincent, the collector's name being illegible. In lieu of finding the Stokes collection, the NY sheet is selected as the lectotype, as it has the most complete leaf.

Urban (1910) published *Gouania lupuloides* var. *aptera* based on two young fruiting collections (*P. Sintenis 1960* and *A. Stahl 782*) and a further one in bud and flower, *P. Sintenis 2211*. I have seen images of the isosyntype, *A. Stahl 782* (HBG), and syntype, *P. Sintenis 2211* (L), and studied the specimens of syntypes *P. Sintenis 1960* (BM, GH, K, US). *P. Sintenis 1960* has the most duplicates available for study, and of these duplicates the diagnostic characters of number of lateral leaf veins and shape of stipule lobes are most easily observed on the US sheet, which is therefore selected as the lectotype. The number of leaf lateral veins, retained stipules, and size of the larger immature fruits support placement of this name in synonymy of *G. lupuloides*.

Considerable consideration was given to evaluating *Gouania viridis*, published in 1919 by Brandegee. Four of the isotypes (*C. A. Purpus 8032*, GH, MO, NY, US) were studied and they, and a number of specimens from primarily low elevation (0–500[900] m) in Caribbean Mexico (Veracruz [e.g., *Ventura A. 2695*], eastern Oaxaca [e.g., *Martínez Calderón 1601*], and Tabasco [e.g., *Calónico S. et al. 21428*]), but extending north to San Luis Potosí (e.g., *Deam 49*), west to Guerrero (e.g., *Kruse 1425*) and central Chiapas (e.g., *Soto N. et al. 13493*), and south to Cortés Department of Honduras (e.g., *Williams & Williams 18809*), share a number of characteristics otherwise unusual in *G. lupuloides*: abaxial surface of leaves either pilose or with straight trichomes extending at right angles to surface, stipules with the upper lobe narrowly triangular, firm and erect and not at all flexuous and the lower lobe extending straight downward and subulate to linear and frequently lost (Fig. 1C), and short stamen filaments, 0.3–0.5 mm long and equal in length to twice as long as anthers. These stipule and stamen characteristics are individually found scattered throughout the range of the species in southern Mexico, Central America, and the West Indies, while concentrations of specimens with pilose or straight trichomes extending at right angles to the leaf surface are found mainly in middle to upper elevations of central Guatemala (850–1900 m) and in Hispaniola. Within the group sharing the viridis characteristics, those specimens from the more eastern part of the range (e.g., *Purpus 2274*, Veracruz, Mexico) have ferruginous trichomes on the sepals, while those from further west (e.g., *Reyes-García & Urquijo 890*, Chiapas, Mexico) have the more typical yellow-white trichomes. While the variation in these characters is noteworthy, it is not consistent enough to warrant taxonomic recognition. The placement of *G. viridis* in synonymy of *G. lupuloides* follows Fernández (1986).

Hadač (1970) published *Gouania lupuloides* var. *parvifolia*. I have studied the holotype and it fits well within the species concept of typical *G. lupuloides* employed here, thus the name is placed in synonymy.

Usually the disc lobes of *Gouania lupuloides* are 1/5 to 2/5 the length of the sepals and are apically as wide to twice as wide as long and do not taper. However, occasional specimens (e.g., *Durán 1838* and *Rico A. 1186*, Yucatán, Mexico, and *Correll 42156*, Bahamas) have at least some flowers that approach *G. polygama* in the disc lobes 1/2 the sepals in length and tapering to a point, or also on occasion the disc lobes 1/2 the sepals in length but not narrowed to a point (e.g., *Zelaya 97*, Honduras, and *von Eggers 6312*, Grenada), or narrowed to a point but 1/3 the length of the sepals (e.g., *Cabrera C. & de Cabrera 9297*, Yucatán, and *Sandoval & Chinchilla P. 762*, El Salvador).

Probable hybrids exist between *Gouania lupuloides* and *G. polygama*, and are discussed under the latter. *Gouania lupuloides* has at times been confused with *G. colombiana*, *G. conzattii*, *G. croatii*, *G. eurycarpa*, *G. guiengolensis*, *G. obamana*, *G. polygama*, *G. rosei*, and *G. stipularis*, and distinguishing characteristics are discussed under those species. Illustrations labeled as *G. lupuloides* but representing other species are found in Krings and Braham (2005: 126, tab. 10.1, fig. C, c, based on *Gentle 236* from Belize [actually *G. eurycarpa*]), Bornstein (1989: 163, tab. 69, fig. a, depicting a flowering branch with most of the leaves having seven or eight lateral veins per side of the midrib [characteristic of *G. polygama*]), Liogier (1982: 62, tab. 13, fig. C, a flower with trichomes along the disc annulus and long apically pointed disc lobes [characteristic of *G. polygama*, a name treated as a synonym of *G. lupuloides* in that publication]).

The name *Gouania lupuloides* has also been misapplied in South America, where it is not known. The specimen cited as this species for Ecuador by Liesner (1999), *Gudiño 527*, MO, I identify as *G. alnifolia* Reissek, which differs from *G. lupuloides* in having relatively longer and lanceolate and acuminate disc lobes and mericarps that are dumbbell-shaped. Two of the specimens cited as *G. lupuloides* for Peru by Macbride (1956), *Klug 2361* and *Méxia 6392*, without herbaria acronyms, I identify (based on the MO duplicates) as *G. riparia* Reissek (following Reissek's original description), which differs in having the floral disc completely pubescent, the

fruits with very thick lobes, the leaves with more lateral veins (ca. eight on either side of the midrib) and the tooth glands with small tufts of trichomes. Two others, *Tessmann 4533* and *4682* (herbaria not indicated), are, based on duplicates of both at G and NY, *G. colombiana* (see that species discussion for distinguishing traits). The specimens cited as *G. lupuloides* by Brako and Pool (1993) for Peru, *Smith et al. 3652* (MO), and by Tortosa (2008) for Argentina, *Vanni 2765* (CTES) and Paraguay, *Zardini 40052* (BAA, MO, PY), are all *G. polygama* (based on the MO duplicates; see discussion below that species for distinguishing traits). The last collection, *Zardini 40052* (G, MO), was additionally cited for *G. lupuloides* in Cusato and Tortosa (2013).

Gouania paniculata Spreng. was published by Sprengel in 1822 as a new species from Hispaniola, included by de Candolle (1825) in his treatment of *Gouania* as *Gouania* ? *paniculata*, and treated by Suessenguth (1953a) as a synonym of *G. lupuloides*. See the Rejected Name section for lectotypification, placement, and discussion.

Selected specimens examined. UNITED STATES. **Florida:** Dade Co.: Miami, *Small & Carter 505* (NY); Elliots Key, *Britton 361* (NY); Monroe Co.: Key Largo, *Correll et al. 40277* (MO); Key West, *Seibert 1231* (MO).

BELIZE. **Cayo:** Branch Mouth N of El Cayo, *Bartlett 11951* (MICH); Chial rd., *Arvigo et al. 733* (MO, NY, US). **Toledo:** Colombia River ca. 1 km from San Pedro, BARC farm, *Houck 3761* (NY). COSTA RICA. **Alajuela:** Zarcero, *Smith A346* (F, MO, NY). **Cartago:** Cerros de La Carpintera, *Lent 3636* (CAS, F, MO, NY, TEX, US). **Guanacaste:** Nicoya, *Tonduz 13786* (BM, GH, K, US). **Puntarenas:** Monteverde, San Luis valley on Pacific slope, *Haber & Bello C. 3532* (MO, TEX); Buenos Aires, R. I. Ujarrás, Cordillera de Talamanca, *Valerio 79* (F, MO); Coto Brus, Z. P. Las Tablas, Cuenca Terraba-Sierpe, camino de Echandi a las Alturas, *Alfaro 1838* (MO). **San José:** Cerros Escazú–La Carpintera, Escazú a Alto Tapezco por Bebedero, *Hammel et al. 19062* (MO, TEX). EL SALVADOR. **Ahuachapán:** San Francisco Menéndez, El Corozo, Mariposario, *Rosales 1519* (BM, MO); San Benito, *Sandoval & Chinchilla P. 762* (MO). **Cabañas:** Cinquera, camp. El Niño, *Monterrosa S. & Carballo 466* (MO). **Chalatenango:** Nueva Concepción, area protegida Pananalapa, El Vado, *King & Chávez 83* (BM, MEXU, MO). **La Libertad:** Finca La Hiralda, *Sidwell et al. 720* (BM, MO). **La Unión:** vic. of La Unión, *Standley 20691* (GH, US). **San Salvador:** San Salvador, *Calderón 1256* (GH, NY, US). **Santa Ana:** lower slopes of Volcán Chingo, *Sidwell et al. 841* (BM, MO, NY). GUATEMALA. **Alta Verapaz:** Cubilgüitz, *von Türckheim 8503* (F, K, NY, US). **Baja Verapaz:** betw. Salamá & Rabinal, *Harmon & Dwyer 4348* (MICH, MO). **Chimaltenango:** Volcán de Acatenango, *Gómez 18* (MO, TEX). **Chiquimula:** Chiquimula, aldea Sabana Grande, *Chávez s.n.* [6 Oct. 1997] (MEXU). **El Progreso:** old rd. near bottom of Río Grande Valley, *Iltis G-67* (F). **Escuintla:** Escuintla, *Morales R. 875* (US). **Guatemala:** near Finca La Aurora, *Aguilar G. 219* (F); near Amatitlán, *Standley 61408* (F). **Huehuetenango:** Nentón, *Seler & Seler 3277* (A, CAS, GH). **Izabal:** Los Amates, *Deam 110* (F, GH, MICH, MO, NY, US). **Jutiapa:** vic. of Jutiapa, *Standley 76326* (F). **Petén:** La Libertad & vic., *Aguilar H. 345* (A, MICH, MO, NY). **Quetzaltenango:** El Palmar, *Skutch 1446* (A, F). **Quiché:** *Aguilar 1127* (F). **Retalhuleu:** region of Ajaxá, E of Santa Cruz Muluá, *Standley 88245* (F). **Sacatepéquez:** 2.3 mi. SW of Alotenango slopes of Volcán del Fuego, *Croat 41935* (MO, TEX). **Santa Rosa:** Cenaguilla, *Heyde & Lux 4127* (G, GH, K, M, US). **Suchitepéquez:** Cocales, *Standley 62079* (F). **Zacapa:** trail betw. Río Hondo & waterfall, *Steyermark 29499* (F). HONDURAS. **Choluteca:** San Marcos de Colón, 7 km N de San Marcos de Colón, *Hazlett 972* (MO). **Comayagua:** along river at Siguatepeque, *Williams & Williams 18471* (F). **Copán:** betw. San Jerónimo & Concepción, Cordillera Gallinero o Grito, *Molina R. et al. 33615* (MEXU, TEX). **Cortés:** along Río Lindo, near Peña Blanca, *Williams & Williams 18809* (F, US). **Francisco Morazán:** Valle de Ángeles, 20 km E de Tegucigalpa, *Zelaya 97* (MO); San Antonio de Oriente, near Jicarito, *Williams & Molina R. 10573* (A, F, LL, MICH, MO). **Lempira:** Gracias, *Nelson et al. 281* (MEXU, MO). **Ocotepeque:** Sinuapa, La Montañita on Cordillera Merendón, *Molina R. 22538* (F, NY). **Olancho:** vic. of Juticalpa, *Standley 17536* (F). **Valle:** Isla Tigre, vic. of Amapala, *Standley 20776* (GH, US). **Yoro:** along Río Guaymón, betw. La Ceiba & San Pedro Sula, *Croat & Hannon 64650* (MO, TEX). MEXICO. **Campeche:** San Antonio Ebulá, *Pavon L. 187* (MEXU); carr. Kalkiní–El Remate, Km. 12.5, *Peña-Chocarro et al. 592* (BM, MEXU, MO). **Chiapas:** Frontera Comalapa, 6 km al W de Cd. Cuauhtémoc, *Soto N. et al. 13493* (BM, MEXU, MO); Villa Corzo, 56 km S of Mexican Hwy. 190 near jct. to Jerico on rd. to Nueva Concordia, *Breedlove & Davidse 54431* (MO; Fig. 1C); 13 km E of Ocozocoautla on Rte. 190, then N on rd. to Aguacera, *Hufi et al. 2259* (BM, MO, TEX); Mirador "Manos que imploran," 10 km al SW de Chicoasén, *Reyes-García & Urquijo 890* (BM, MEXU); Trapichito, near Comitán de Domínguez, *Matuda 5729* (LL, MEXU); Ocosingo, en el vértice del Río Chixoy a 90 km al S de Boca Lacantum, *Martínez S. 18335* (MEXU, MO); a 5 km al E del poblado de Nuevo Guerrero, *Aguilar M. & López A. 9194* (MEXU); 1 km N of Ocozocoautla de Espinosa, *Breedlove 19832* (MO); Pijijiapan, carr. costera Soconusco, *Aquino 211AA* (MEXU); Tapachula, 5 de Febrero, *Ventura V. & López 734* (BM, MO, NY); Tuxtla Chico, La Toma, Soconusco, *Aquino 202AA* (MEXU). **Chihuahua:** Batopilas, *Goldman 218* (F, GH, US); E of La Bufa on side of Barranca de Batopilas, *Bye 8845* (MEXU, MICH); N side of Barranca de Batopilas, betw. La Bufa & Quírare, arroyo Buenas Aires, *Bye et al. 18021* (MEXU). **Durango:** Tabahueto (al catorce), 196 km al W de Tepehuanes, *Torres C. et al. 3560* (F, MEXU, MO; Fig. 1G, NY). **Guerrero:** Chilpancingo, 500 m al N de Rincón de La Via, ca. de la casa de Don Cele, *Kruse 1425* (MEXU, MO); Iguala y Buenavista, Cañón de La Mano, entre Los Amates y El Naranjo, *Catalán H. 184* (MEXU, MO); Malinaltepec, *Wagenbreth 775* (B, MEXU). **Hidalgo:** 22 km W de Huejutla de Reyes, *Hernández M. 4029* (MEXU, MO). **Jalisco:** El Pitillal, 2 km al NE de Puerto Vallarta, *Rzedowski 17801* (MEXU, MICH, TEX); 18–19 km SEE de Autlán, 2–3 km al NE de La Yerbabuena, *Cuevas G. & Nuñez 3987* (MEXU). **México:** Tejupilco, N de Bejucos, S de Nanchititla, *Zepeda G. 279* (MEXU); Temascaltepec, Tenayac, *Hinton 5139* (BM, K). **Michoacán:** Sierra Madre del Sur, ca. 32 km N Playa Azul, *King & Soderstrom 4979* (MEXU, MICH, NY, TEX); Coalcomán, Puerto Zarzamora, *Hinton & Hinton 12248* (K,

MICH). **Morelos:** Llanos de Guarin–Barranca del Terrón, *Vázquez S. 2603* (MEXU). **Nayarit:** 8.5–9.5 km E of Ruiz, *Bartholomew et al. 2606* (GH, MO, NY); lake NE of Santa María del Oro, *Feddema 764* (MICH); Tuxpan, *Mexía 1085* (A, GH, MICH, MO). **Oaxaca:** Tuxtepec, *Martínez Calderón 1601* (MEXU, MO, NY); San Miguel Chimalapa, Rancho Los Domínguez, 4 km al S de Congragación Benito Juárez por el río Portamonedas, *Maya J. 621* (MEXU, MO, NY); Miahuatlán, Mpio. San Jerónimo C., Cañada del Río Trapiches, *Campos V. 3345* (F, MEXU); Pochutla, Mpio. San Miguel del Puerto, San Isidro Chacalapa, *Perret et al. 76* (MEXU, MO); Tuxtepec, Temascal, lado SW de la Presa Miguel Alemán, *Cedillo T. & Torres C. 1036* (MEXU, MO). **Querétaro:** Jalpan, 7–8 km al NW de Rancho Nuevo, *Servín O. 1225* (MEXU). **Quintana Roo:** Cobá, orilla de Laguna de Cobá, *Téllez V. & Cabrera C. 3769* (BM, MEXU, MO, NY). **San Luis Potosí:** Tolosa, *Deam 49* (F, GH, MICH); El Sol, *Sharp 441848* (GH, MEXU); Tamasopo Canyon, *Pringle 3210* (BM, F, GH, K, MEXU, MO, NY, US); Est. For. Exp., 25 km al E de Tamulín, *Rzedowski 23348* (F, LL, MICH). **Sinaloa:** Imala, *Gentry 4949* (GH, MEXU, MICH, MO; Fig. 1E, NY); Estero de Escuinapa, *González Ortega 6113* (GH, MEXU, US). **Tabasco:** 7.58 km al E de Teapa, *Calónico S. et al. 21428* (BM, MEXU, MO); Teapa, Puyacatengo, *Ventura A. 20865* (GH, MEXU, NY). **Tamaulipas:** 10 km NW of El Progresso, 18 km NW of Ocampo, *Stanford et al. 993* (GH, MO, NY); 20 km E de Aldama, carr. a Barra del Tordo, *Martínez 882* (MEXU); 32 km E of Soto La Marina on rd. to La Pesca, *Fryxell 3683* (MEXU, MICH, MO, NY, TEX, US). **Veracruz:** Puente Nacional, Conejos, *Ventura A. 2695* (F, MICH, NY, TEX, US); San Andrés Tuxtla, El Salto de Eyipantla, a 8 km del Pueblo de Sihuapan, *Calzada 1684* (BM, F, MEXU; Fig. 1F); cerros cercanos a Chicuaseu, a 11 km de Actopan, *Lot H. 1050* (BM, F, GH, MO); Zacuapan, *Purpus 2274* (F, GH, MO, NY); Arroyo Blanco 2 km de San Juan del Río brecha a Playa Vicente, *Tenorio L. & Torres C. 5262* (MEXU, MO); Fracionamiento Totonicapan, 3 km al N de Catemaco, carr. Catemaco–Coyame, *Cedillo T. 2913* (MEXU); Jesús Carranza, 3 km del límite con Oaxaca, ca. 37 km al NE de Real de Sarabia, *Perino 3218* (MEXU, NY); Hwy. Mex. 180, 10 km SE of Río Páunco opposite Tampico & 1.5 km NW of Tampico Alto, *Nee & Taylor 28696* (F, NY). **Yucatán:** ruins of Labna, *Darwin 2170 et al.* (MO; Fig. 2H); a 3 km al SE de Tixkokob, 9 km al NO del poblado Ruinas Ake, *Cabrera & de Cabrera 9460* (MEXU, MO; Fig. 1D); alrededores de la zona arqueol. Sayil, a 35 km al SO de Oxkutzcab, *Cabrera C. & de Cabrera 9571* (BM, MO); 3 km al W de Koncal, *Rico A. 1186* (K); Mérida, *Schott 668* (BM, F, MO); carr. Mérida–Sierra Papacal–Chuburná Puerto, 2 km N de Komchen, *Carnevali & May-Pat 5933* (F, MEXU, MO); Celestún, sobre el camino de Chunchucmil, *Durán 1838* (MEXU, MO); Opichén, above Calcehtok, *Darwin 2272* (MO); San Juan Tekax, camino a Iturbide, *Simá 1490* (MEXU); Valladolid, 8 km from Xuilub on rd. to Xocen, *Mogensen 1166* (MO); a 1 km al E de Ticuch, por la carr. Cancún–Valladolid, *Cabrera & de Cabrera 9297* (MEXU, MO, NY). NICARAGUA. **Atlántico Norte:** vic. Waní, *Ortíz 894* (MO, TEX). **Boaco:** 5 km al SE de Camoapa, Tolinapa, *Moreno 18656* (MO, TEX). **Carazo:** Comarca El Aguacate, 4 km S of Jinotepe, *Neill 1053* (MO, TEX). **Chinandega:** 3–4 km al SE de San Pedro de Potrero Grande, Los Laureles, *Moreno 11711* (MO, TEX). **Chontales:** 7.5 km NNE of Cuapa rd. toward Muy Muy, before Matayagual, *Stevens & Montiel J. 28061* (MO). **Estelí:** El Hornillo, S de Santa Cruz, *Moreno 22274* (MO, TEX); Cerro San Ramón, 6.3 km al O de Pueblo Nuevo, *Moreno 5621* (MO, TEX). **Granada:** 1 km al N de Casa Teja, *Moreno 5377* (MO, TEX). **Jinotega:** Valle El Horno, *Moreno 5029* (MO, TEX). **León:** Mpio. de El Sauce, carr. entre el empalme de El Sauce (carr. a San Isidro), *Coronado G. & Rueda 3516* (MO); new rd. from Hwy. 1 (at ca. Km. 135.5 & ca. 10.6 km W of bridge at La Trinidad) to San Nicolás, *Stevens 10246* (MO, TEX). **Madriz:** Finca San Martín, lado N de la casa hacienda, Cerro Volcán Somoto, *Moreno 3004* (MO, TEX). **Managua:** small E-W ridge along Hwy. 8, ca. 0.4 km from Hwy. 2 intersection, *Stevens 5151* (MO, TEX). **Matagalpa:** Puertas Viejas, lado 5 km S de la Laguna Moyuá, *Moreno 4879* (MO, TEX); Hwy. 5, ca. 38.7 km from Hwy. 3 intersection, *Stevens 6030* (MO, TEX). **Nueva Segovia:** 2.8 km. S of Mozonte–San Fernando rd. (at Km. 239) along rd. to San Antonio, *Stevens & Montiel J. 30518* (MO). PANAMA. **Chiriquí:** Jaramillo, E of Boquete, *Schmalzel 1844* (MO); E of Boquete along rd. to Cerro Azul, *Croat 26764* (MEXU, MO).

BAHAMAS. S Bimini, N of airstrip, *Correll 42156* (NY); New Providence, S of Lake Cunningham, *Correll 50213* (NY); Great Abaco Island, ca. 5 mi. N of Dundas Town, main rd., *Wunderlin et al. 8309* (GH, MO). BARBADOS. Foster Hall Wood, *von Eggers 7127* (A). CUBA. **Camaguey:** Cayo Ballenato Grande, *Shafer 916* (NY, US). **Holguin:** Cerro de Fraile prope Holguin, *Ekman 3252 (P.I.T.R. III)* (A). **La Habana:** N of Marianao, *León 5696* (NY, US). **Matanzas:** near Matanzas, *Rugel 1* (BM, MO, NY). **Pinar del Río:** Buenaventura & vic., *Wilson 9450* (NY). DOMINICAN REPUBLIC. **Azua:** jct. Arroyo Hondo & Arroyo Mancebo, new rd. Sabana de Miguel Martín, *Mejía 8332* (MO, NY). **Barahona:** Sierra de Baoruco, 2.6 km desde Las Auyamas de Polo en el camino a Los Charquitos y Las Tayotas, *Zanoni et al. 18969* (MO, NY, TEX). **La Altagracia:** halfway betw. Boca del Yuma town & El Caracol (old bridge over Río Duey), *Zanoni et al. 10737* (MO, NY). **Peravia:** San José de Ocoa, 9 km S of Los Arroyos, near La Horma, *Mejía 8766* (MO, NY, TEX). **Puerto Plata:** Santo Domingo, Cordillera Septentrional, La Cumbre, *Ekman H16102* (G, LL, NY, US). HAITI. **Artibonite:** 18 km NO del Poblado de Gros Morne, en la carr. a Port-de-Paix, *Zanoni et al. 27650* (MO, NY). **Nippes:** Massif de la Hotte, near Etang-Miragoâne, *Ekman H7236* (F, LL, US). **Nord-Quest:** Port-de-Paix, vic. Basse Terre, Tortue Island, *Leonard & Leonard 12451* (US). JAMAICA. **St. Andrew:** Hope River Plain, 1 mi. E of Mona, *Yuncker 17310* (F, MICH, NY). **St. Elizabeth:** near rd. to S coast, *Bretting J-82* (GH, MICH, MO, NY). **St. Thomas:** Four Mile Wood, *Nesbeth & Scott 5* (MO). LEEWARD ISLANDS. **Antigua:** near Fig Tree Hill, *Box 1228* (MO). **Dominica:** St. Mark, Petite Coulibrie, *Whitefoord 5832* (BM). **Guadeloupe:** Carbet, St. Pierre, *Duss 650* (F, GH, MO, NY, PR, US); Basse Terre, ravine de Belou, *Rodriguez 2566* (A). **Marie Galante:** vic. Pointe de Folle Anse, 2 km SW of St. Louis, *Proctor 20297* (A, BM). **Montserrat:** s. loc., *Shafer 321* (F, NY, US). **St. Barthelemy:** St. Jean, *Questel 851* (NY). **St. Maarten:** s. loc., *Boldingh 2811* (NY). PUERTO RICO. rd. to Guilarte Forest, Km. 4.7, *Schubert & Winters 444* (GH, US); Res. For. Guánica, *Boom 10030* (CAS, MO, NY, TEX); San Germán, *Vélez 379* (NY); San Juan, montes de San Patricio, W of Villa Borinquen, *Carrasquillo 117* (NY). VIRGIN ISLANDS. **St. Croix:** Bassin, *Ricksecker 50* (F, MO, NY); Christiansted, *Rose et al. 3606* (US). **St. John:** above Cinnamon Bay on rd. to Herman Farm, *Mori & Woodbury 17003* (NY, TEX). **St. Thomas:** Agric. Exp. Stat.,

Mayagüez Campus, Univ. Puerto Rico, Río Piedras, *Woodbury WI-72* (MO, NY). **Tortola:** Flamingo Pond, *D'Arcy 285* (A). WINDWARD ISLANDS. **Grenada:** s. loc., *von Eggers 6312* (US); Old Fort, *Miller 108* (US); Carriacou, *Howard 10855* (B, BM, GH, MICH, NY). **Martinique:** St. Pierre, *Hahn 373* (G, GH, TEX, US). **St. Lucia:** Soufriere, *Jean-Pierre 51* (A). **St. Vincent:** Lodge Rion, *von Eggers 6832* (A).

10. Gouania obamana A. Pool, sp. nov. TYPE: Mexico. Veracruz. Municipio San Andrés Tuxtla, Estación Biología Tropical Los Tuxtlas, lote 67, selva alta perennifolia, borde, 18°34′–18°36′N, 95°04′–95°09′W, 200 m, 3 abr. 1984, *G. Ibarra Manríquez 1446* (holotype, MEXU!; isotypes, MEXU!, MO!, NY!). Figures 2I, 12A–C.

Diagnosis. New species similar to *Gouania polygama* (Jacq.) Urb., but with mericarps velutinous and with taller wings, larger seeds, and pairs of lateral leaf veins three to five on either side of the blade midrib.

Liana; young branches hollow, abundantly to sparsely tomentose (early glabrescent) or sericeous, trichomes light red-brown. Leaf blades 4.2–13 × 2.3–8 cm, ovate or elliptic, subcoriaceous, adaxial surface drying dark red-brown or black-green, glabrous or with few trichomes restricted to venation, 0.2–0.5 mm, straight, appressed and ascending, white or light red-brown, abaxial surface drying green or light brown-green, when very young sometimes with sparse scattered trichomes, these retained only in axils of venation or sometimes also on venation, 0.1–0.5 mm, ± straight and appressed, on venation ascending, in axils spreading and matted, lateral veins 3 to 5 per side of the midrib, diverging at 45°–60° angles, base rounded to obtuse, or rounded and then shortly decurrent, margin crenulate to nearly entire (rarely crenate with 1.5 to 2 teeth/cm), tooth glands minutely pustular to minutely pulvinate (rarely cupular), apex rounded, acute or obtuse and then bluntly cuspidate or less frequently acute or bluntly acuminate, sometimes apiculate at tip; stipules 2-lobed, lost before leaves expand, upper lobe 3–4 × 0.9–1.5 mm, upward curving to spreading, lanceolate and acuminate, lower lobe 1–2 × 0.4–0.5 mm, downward curving to spreading, lanceolate and acuminate or ovate and acute; petioles 10–25 mm. Inflorescence with longest racemiform part 7–20 cm, indumentum of rachis usually densely tomentose, less frequently minutely puberulent, with trichomes light red-brown to yellow-white, bract of cyme 2–3 mm, lanceolate, acuminate, cymes appearing sessile (rarely with peduncle to 4 mm), mature flowers appearing sessile to pedicels to 1.5 mm, hypanthium densely minutely velutinous with trichomes white-yellow or light red-brown; sepals (0.6–)0.9–1.25 mm, externally abundantly minutely sericeous or tomentose, trichomes white-yellow or light red-brown; petals 0.6–1 mm; stamens with filaments 0.5–0.8(–1) mm, anthers 0.25–0.3 mm; disc excluding lobes 1–2 mm diam., annulus with few to numerous trichomes, disc otherwise glabrous, disc lobes 0.25–0.35 × 0.4–0.6 mm at apex, transversely rectangular to square, generally apically bilobed, 1/4–1/3(1/2) length of sepals; style glabrous. Young fruits densely velutinous, trichomes white-yellow or light red-brown; mature mericarps dumbbell-shaped (Fig. 2I), the wings ± attaching to the base and sides of fruit body, externally drying brown-yellow, darker over fruit body, velutinous with trichomes dense on fruit body and abundant to sparse on wings 0.05–0.5 mm, white or light red-brown, internally drying with wings and fruit body pale yellow or white, or sometimes fruit body slightly darker and/or wings with pale brown radiating indistinct streaks, fruit body 4–6 mm high, wings (9)10–14 mm high, distance between highest points of 2 wings 8–13 mm, width of mericarp 14–20 mm, 2.75–4× height of fruit body, width of fruit body (3–)4–5 mm, 1/5–1/4(–1/3) width of mericarp; seeds ca. 3.5 × (2.6–)2.75–3(3.5) mm, shiny brown.

Etymology. This species is named in honor of Barack Obama, the 44th president of the United States of America, who has stressed the importance of funding basic science.

Phenology. *Gouania obamana* has been collected in flower from December to February and less frequently in March.

Habitat and distribution. *Gouania obamana* is known from Atlantic Mexico in eastern Puebla, Veracruz, and Tabasco and extending across the Isthmus of Tehuantepec into Oaxaca. The species is disjunct in eastern Chiapas extending into Guatemala (Petén and Izabel), Belize, and Honduras (Atlántida). It is found in evergreen forests, from 0 to 950 m elevation (Fig. 4A).

IUCN Red List category. Assessed as Data Deficient (DD) by IUCN (2012) criteria, *Gouania obamana* is known from 70 collections (58 georeferenced) from Veracruz in Mexico south to Belize and northeastern Honduras, found in evergreen forests. The area of occupancy is estimated to be 172 km^2 and 63% of the collections fall outside of protected areas. Further study is recommended to understand the factors determining this species distribution and any risk factors.

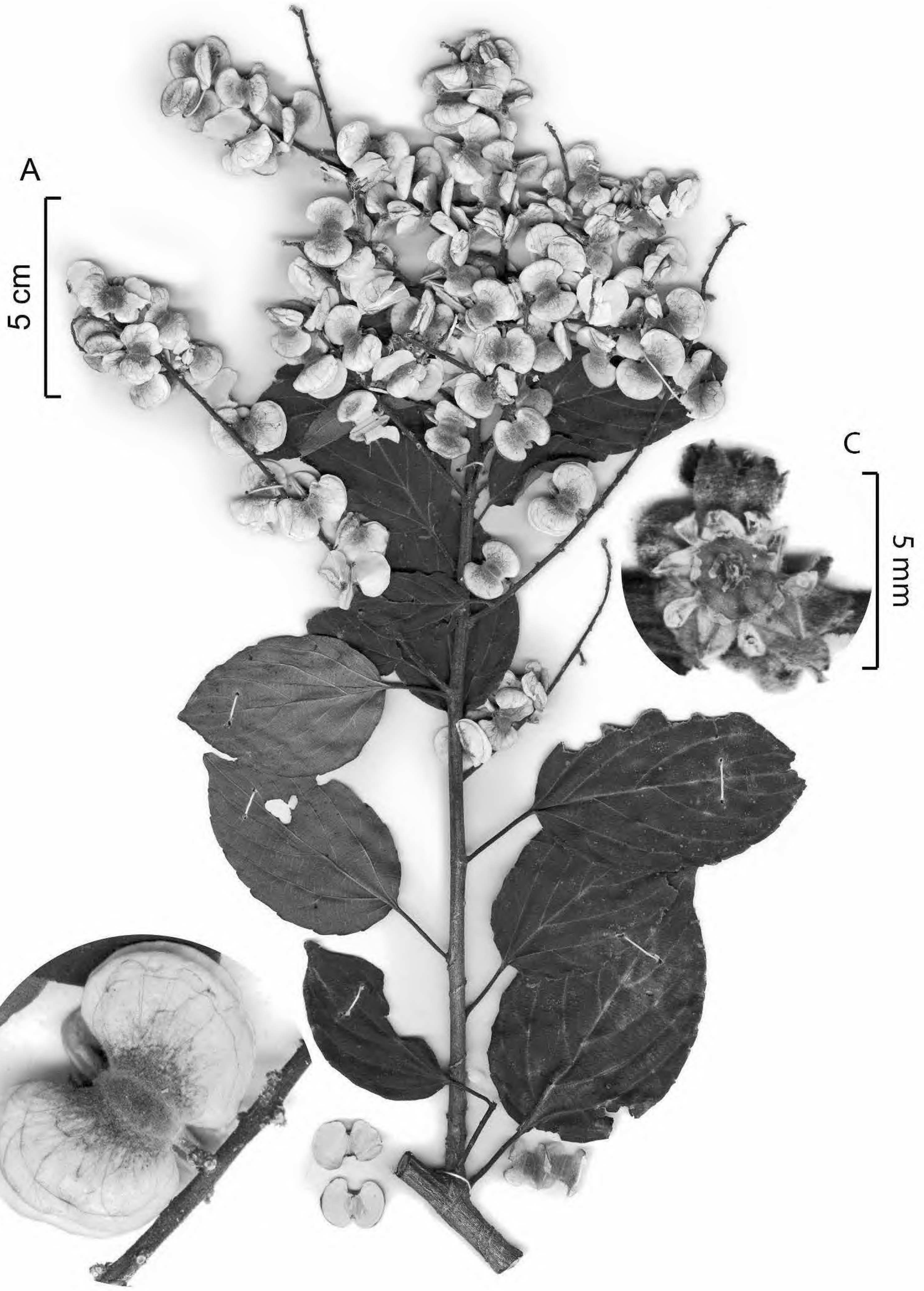


Figure 12. *Gouania obamana* A. Pool. —A. Fruiting branch. —B. Portion of infructescence with fruit. —C. Flower at inflorescence node. A, B scanned from the holotype *G. Ibarra Manríquez 1446* (MEXU); C scanned from the paratype *G. Ibarra Manríquez et al. 5507* (MO).

Discussion. Specimens of this previously undescribed species have been identified and cited in the literature under both *Gouania lupuloides* (for Belize, Balick et al., 2000: *Balick 3612*; *Gentle 1921*, *3185*, *3226*, *8543*, *8641*, *9298*; and for Veracruz, Fernández, 1986: *Calzada 104*; *Dorantes L. et al. 2543*, *3991*; *Ibarra Manríquez 6; Vázquez et al. 16*, *573*; *Ventura A. 12420*, *15039*, *15696*, *18141*) and *G. polygama* (for Veracruz, Fernández, 1986: *Cedillo T. & Calzada 176*; *Dorantes L. et al. 3991*; *Menéndez L.*

91). *Gouania obamana* is similar to *G. polygama* in its dumbbell-shaped fruit and pubescent annulus, but differs in mericarp pubescence and size (velutinous, wings (9)10–14 mm high in *G. obamana* vs. nearly glabrous, wings (4–)5–8(–9) mm high in *G. polygama*), seed size (3.5 mm in *G. obamana*, (1.8–) 2.2–2.75 mm in *G. polygama*), and the number of lateral leaf veins on either side of the blade midrib (three to five in *G. obamana* vs. (six)seven or eight(nine) in *G. polygama*). In addition, the leaves of *G. obamana* are nearly glabrous with tufts of trichomes in the vein axils of the abaxial blade surface, a state not seen in *G. polygama*, and the disc lobes of *G. obamana* are square or transversely rectangular and 1/4–1/3(1/2) the length of the sepals, versus often apically tapering and (1/3–)2/5–3/5(–2/3) the length of the sepals in *G. polygama*. *Gouania obamana* is easily distinguished from *G. lupuloides* by mericarp type and pubescence (dumbbell-shaped and densely pubescent in *G. obamana* vs. butterfly-shaped and glabrous in *G. lupuloides*) and flower annulus (pubescent in *G. obamana* vs. glabrous in *G. lupuloides*). They are also easy to separate when sterile, as *G. obamana* has bicolored, subcoriaceous leaves and the stipules lost very early, while *G. lupuloides* has monocolored, membranaceous leaves and persistent stipules.

One specimen from Chiapas (*Durán F. & Levy T. 360*, MEXU) seems to represent a hybrid between *G. obamana* and *G. polygama*. It has the leaves resembling those of *G. obamana* (subcoriaceous, bicolored, glabrous excluding tufts of trichomes in vein axils, four lateral veins per side of midrib), and the mericarps are pubescent but are much smaller than those of *G. obamana* and fall within the range for *G. polygama* (fruit body height 3 mm, wing height 7 mm, distance between highest points of two wings 6 mm, width of mericarp 9 mm, width of fruit body 3 mm) and seeds only 2.75 mm long.

Paratypes. BELIZE. s. loc., *M. E. Peck 621* (K); Seven Hills, *E. J. F. Campbell 76* (K); Río Grande, *W. A. Schipp 8–457* (F). **Cayo:** Humming Bird Hwy., *P. H. Gentle 8641* (LL, MO, NY, US). **Stann Creek:** Humming Bird Gap, Humming Bird Hwy., *P. H. Gentle 9298* (CAS, LL, MO, NY, US); Stann Creek Valley, Baboon Ridge, *P. H. Gentle 3185* (A, DS, MICH, NY, TEX, US); Mullins River Rd., *P. H. Gentle 1921* (A, F, K, MEXU, MICH, NY), *8543* (CAS, LL, NY); Stann Creek Valley, Antelope Ridge, *P. H. Gentle 3226* (A, MICH, NY). **Toledo:** rd. to Laguna Village off hwy. from Dangriga to Punta Gorda, *M. J. Balick et al. 3612* (MO, NY, US); betw. Rancho Chico & Cockscomb, Monkey River, *P. H. Gentle 4376* (MICH, TEX); near Jacinto Hill, *P. H. Gentle 5121* (LL, MO). GUATEMALA. **Izabal:** Río Chacón, *H. Johnson 1194* (F); Entre Ríos, *H. E. Kuylen "E"* (US); near Entre Ríos, *P. C. Standley 72684* (F); betw. Cienaga & Puerto Méndez, along Petén–Río Dulce Hwy., *R. Tún Ortíz 2354* (BM, F, MICH); 1.4 km N of San Felipe, *W. E. Harmon & J. A. Fuentes 2082* (MEXU, MO); El Estor, *E. Contreras 11148* (CAS, LL, MO); Morales, *W. A. Kellerman s.n.* [8 Mar. 1907] (US); Puerto Barrios, *C. C. Deam 68* (GH, MICH), Puerto Barrios, ca. 20 km from town on rd. to Machacas, *N. T. Marshall et al. 319* (TEX). **Petén:** Flores–Poptún Rd., Km. 85, *C. L. Lundell 17312* (CAS, F, LL, US); San Pedro, Km. 160 Cadenas Rd., *E. Contreras 9498* (LL, MO, US); Los Arcos, W of Km. 149 Cadenas Rd., *E. Contreras 9450* (LL, MO, NY, US). HONDURAS. **Atlántida:** Cuyamel, *M. A. Carleton 442* (US). MEXICO. **Chiapas:** Ocosingo, en el vertice del Río Chixoy camino a Chajul, sobre la carr. fronteriza del S, *E. M. Martínez S. M-16082* (MO), en Nv. Chihuahua a 28 km al N del vertice del Río Chixoy camino a Boca Lacantum, *E. M. Martínez S. 16181* (MO), a 2 km al N de El Turrbo camino Monte Líbano Chancala, *E. M. Martínez S. 17454* (MO), en Ejido Loma Bonita, *E. M. Martínez S. & R. Lombera 26087* (K, MEXU). **Oaxaca:** Comaltepec, Puerto Eligio, Km. 152 carr. Tuxtepec–Oaxaca, Sierra Juárez, *G. Martínez Calderón 710* (F, TEX); Juchitán, 12 km al N de Guevea de Humboldt, *R. Torres C. et al. 2539* (MEXU, MO, NY); Tehuantepec, Belleville, *C. R. Orcutt 3048* (DS, F, MO). **Puebla:** Hueytamalco, Campo Experimental "Las Margaritas," Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias, *G. Ibarra Manríquez et al. 5507* (MO), *G. Ibarra Manríquez et al. 5546* (MEXU, MO). **Tabasco:** 37 km al E de Francisco Rueda, carr. a Huimanguillo, *R. Fernández 2351* (NY); Huimanguillo, camino al Ejido Carlos A. Madrazo, *M. de la A. Guadarrama O. et al. 6106* (MEXU). **Veracruz:** Dos Ríos, *C. D. Mell 505* (F, NY, US); Cerro de San Martín, *J. I. Calzada 104* (F, LL, MEXU); Fortuño, Coatzacoalcos River, *L. Williams 8451* (F, US); Catemaco, Laguna de Sontecomapan, Frente al Río la Palma, *F. Menéndez L. 91* (F, MEXU, MO), Sierra Santa Martha, 14 km SE de la desviación hacia el Batonal, *G. Ibarra Manríquez 6* (MEXU), 30 km al E de Tebanca en Las Cumbres del Poblado el Bastonal, *R. Cedillo T. & J. I. Calzada 176* (F, MEXU, NY); Coatzacoalcos, a 0.5 km al S de los officina de la Comisión Nacional del Agua, *C. H. Ramos Á. & E. M. Martínez S. 2253* (MEXU); Hidalgotitlán, 6 km E de Cedillo camino a La Laguna, *J. Dorantes L. et al. 2543* (F, MEXU, MO), *3991* (MEXU), Brecha Hnos. Cedillo–La Escuadra, *M. Vázquez 573* (F, MEXU), *M. Vázquez et al. 16* (MEXU, MO); Jesús Carranza, al S de Pob. 2 en nuevo camino a Ejido La Paz, *T. L. Wendt & H. Hernández G. 5635* (MEXU); San Andrés Tuxtla, 32 km al N de Catemaco camino a Montepio, *R. Cedillo T. 2624* (F, MEXU), Ejido Balzapote, 2.5 km N de la Est. Biol. Trop. Los Tuxtlas, *S. Sinaca C. 1357* (MEXU), Montepio, 40 km NE del camino Catemaco–Montepio, *G. Ibarra Manríquez 30* (MEXU, MO); San Andrés Tuxtla, Est. Biol. Trop. Los Tuxtlas, *T. P. Ramamoorthy 3382* (MEXU), *C. León G. & A. Campos V. 22* (MEXU), lote 67, *A. Campos V. 5236* (MEXU), *G. Ibarra Manríquez 30a* (MEXU), *421* (MEXU, MO), *G. Ibarra Manríquez & S. Sinaca C. 1251* (MEXU), Laguna Zacatal, *G. Ibarra Manríquez & S. Sinaca C. 3340* (MEXU, MO), Cerro Vigía, *G. Ibarra Manríquez & S. Sinaca C. 3084* (MEXU, MO; Fig. 2I), camino a la Laguna Escondida, *M. O. Dillon et al. 1845* (F, NY, TEX); Tlapacoyan, Cuauhtojapan, *F. Ventura A. 15696* (MEXU), Las Ventanas, *F. Ventura A. 15039* (MEXU), El Limón, *F. Ventura A. 18141* (MEXU), El Papatal, *F. Ventura A. 12420* (MEXU, MICH).

11. Gouania polygama (Jacq.) Urb., Symb. Antill. 4: 378. 1910. Basionym: *Rhamnus polygama*

Jacq., Enum. Syst. Pl. 17. 1760. *Gouania tomentosa* Jacq., Select. Stirp. Amer. Hist. 263. 1763. *Lupulus lupuloides* var. *tomentosus* (Jacq.) Kuntze, Revis. Gen. Pl. 1: 119. 1891. TYPE: s. loc., s.d., "*Herbar. Dr. Jacquin*" *s.n.* (lectotype, designated here, BM1030555!). EPITYPE: Haiti. Banks of Jean Rabel River betw. Bord de Mer & Jean Rabel, 30 Jan. 1929, *E. C. Leonard & G. M. Leonard 12661* (epitype, designated here, US!; isoepitypes, A!, NY!). Figure 2J.

Gouania pubescens Poir. var. *pubescens*, Encycl., Suppl. 2: 819. 1811 [1812]. *Lupulus lupuloides* var. *pubescens* (Poir.) Kuntze, Revis. Gen. Pl. 1: 119. 1891. TYPE: [Haiti] Saint-Domingue, Herb. Lamarck (lectotype, designated here, P-LA not seen, microfiche LM 131/12!).

Gouania crenata var. *cordifolia* DC., Prodr. 2: 39. 1825. TYPE: [Dominican Republic.] Sancto-Domingo, s.d., *C. L. G. Bertero s.n.* (holotype, G-DC not seen, digital image!).

Gouania virgata Reissek in Mart., Fl. Bras. 11(1): 104, tab. 37. 1861, syn. nov. *Gouania virgata* Reissek var. *virgata*, as "[var.] β. *guianensis*" Reissek in Mart., Fl. Bras. 11(1): 105. 1861. TYPE: [Guyana.] "Guyanae britanicae interioris," June 1839, *R. H. Schomburgk 584* (lectotype, designated here, W-0031735 not seen, digital image!; isolectotypes, BM-956387 [date 1838]!, digital image!, BM-544362 [date 1838] not seen, digital image!, BR [s.d.] not seen, digital image!, F [s.d.]!, K [labeled "1st coll."]!, K [date 1838]!, L [s.d.] not seen, digital image!).

Gouania virgata var. *brasiliensis* Reissek in Mart., Fl. Bras. 11(1): 105. 1861, as "[var.] α. *brasiliensis*," syn. nov. TYPE: Brazil. [Minas Gerais] "Barra das Velhas ad ripas fluv. Rio de S. Francisco in prov. Minarum," *J. B. E. Pohl 731 (3107)* (lectotype, designated here, W-0031733 not seen, digital image!, F-neg. 32604!, W lecto. fragm. at F!; isolectotypes, K not seen, digital image!, W-0031734 not seen, digital image!).

Gouania mexicana Sessé & Moc., Fl. Mex., ed. 2, 236. 1894, syn. nov. TYPE: [Mexico?] "calidis N. H.," [Nueva Hispania] *M. Sessé, J. M. Mociño, J. D. del Castillo & J. Maldonado 5202* (lectotype, designated here, MA not seen, F-neg. 47631 [collection # of Field Museum photo label in error 5200]!, digital image!; MA lecto. fragm. at F!).

Liana; young branches solid, indumentum abundantly to densely villous or velutinous (less frequently pilose or tomentose), trichomes red-brown to light red-brown (less frequently yellow). Leaf blades 4–11(–15) × 2–7(–9.5) cm, elliptic, less frequently widely elliptic, ovate, or oblanceolate, membranaceous, adaxial surface drying dark green, or less frequently, dark red-brown, black-green, brown-green (rarely green), glabrous to less frequently abundantly pubescent, with trichomes 0.2–1 mm, straight to slightly curved, most frequently all ascending, sometimes spreading in all directions or kinky, yellow-white to red-brown, abaxial surface drying yellow-green (rarely green and same color as adaxial surface), usually abundantly to densely pubescent, rarely nearly glabrous with trichomes 0.2–1 mm, kinky or straight to slightly curving and spreading in all directions overall or sometimes trichomes of venation straight to slightly curving and mostly ascending, white-yellow to red-brown, lateral veins (6)7 or 8(9) per side of the midrib, diverging at 45°–60° angles, base subcordate, rounded, or cordate, frequently then shortly decurrent, margin serrulate to nearly entire, crenate or serrate, 1 to 4 teeth/cm, tooth glands pustular to cupular, apex acuminate or acute to obtuse and then often cuspidate; stipules 2-lobed, caducous, usually present only at the base of unexpanded leaves or very young leaves, or on juvenile plants, upper lobe (1.5–)2.5–7(–8) × 0.4–2(–3) mm, spreading upward to downward (rarely erect), lanceolate, sometimes asymmetrically so, acuminate (rarely acute), lower lobe (0.5–)1–3.5(–4) × 0.25–1.25 mm, curving downward, less frequently spreading, ovate to lanceolate, acute to acuminate (rarely oblong and acute or subulate foot); petioles (3–)4–15(–22) mm. Inflorescence with longest racemiform part (7–)11–32(–42) cm, rachis villous, velutinous, or tomentose with trichomes yellow-white to red-brown, bract of cyme (1–)1.5–3 mm, lanceolate, acuminate, cymes appearing sessile, mature flowers appearing sessile to pedicels to 1.5(–2.5) mm, hypanthium and sepals externally densely to abundantly sericeous to tomentose with trichomes yellow-white or light red-brown; sepals (0.5–)0.65–1(–1.2) mm; petals (0.5–)0.6–0.9(–1) mm; stamens with filaments (0.35–)0.5–0.75(–0.8) mm, anthers 0.15–0.25(–0.3) mm; disc excluding lobes (0.9–)1–1.5(–1.8) mm diam., annulus with few to numerous trichomes, disc otherwise glabrous, disc lobes (0.25–)0.3–0.5(–0.6) mm, often lanceolate, acuminate or tapering, less frequently ± square and to 0.4 mm at apex, apically entire or irregularly lobed, (1/3–)2/5–3/5(–2/3) length of sepals; style pubescent. Young fruits sparsely (rarely abundantly) pilose, trichomes yellow-white to red-brown; mature mericarps dumbbell-shaped (Fig. 2J), the wings ± attaching to the sides of fruit body only, externally wings drying brown-yellow, yellow-brown, or red-brown, fruit body usually drying darker, brown, red-brown or black, glabrous to trichomes sparse on fruit body and sometimes wings with some trichomes 0.1–0.3 mm, yellow-white to red-brown, internally drying yellow-white or off-white on wings, slightly to moderately contrasting with fruit body pale brown, pale red-brown, or pale gray-brown, fruit body (2.5–)3–4 mm high, wings (4–)5–8(–9) mm high, distance between highest points of 2 wings (5–)6–10(–13)

mm, width of mericarp (7–)9–17 mm, 3–4(–5) × height of fruit body, width of fruit body (2–)2.5–3.5(–4) mm, 1/6–1/4(–1/3) width of mericarp; seeds (1.8–)2.2–2.75 × 1.4–2.3 mm, green-brown to brown.

Iconography. Gaertner (1805: tab. 183, fig. 1, as *Gouania tomentosa*); Reissek (1861: tab. 25, fig. 8 and tab. 37, as *G. virgata*); Nowicke (1971: 282, tab. 8, as *G. lupuloides*); Liogier (1982: 62, tab. 13, fig. C, as *G. lupuloides*); Fernández (1986: 33, tab. 5); Acevedo-Rodríguez (2003: 364, tab. 144, fig. I–N); Lima and Giulietti (2005: 334, tab. 1, fig. I–J, as *G. virgata*); Krings and Braham (2005: 126, tab. 10.1, fig. D); Cusato and Tortosa (2013: 25, tab. 7, fig. A, C, as *G. lupuloides*).

Habitat and distribution. *Gouania polygama* is known from Mexico (Oaxaca and San Luis Potosí to Chiapas and Campeche), Guatemala (excluding much of the central highlands), Belize, El Salvador, Honduras, Nicaragua, Costa Rica, Panama, Cuba, Hispaniola, Puerto Rico, St. Vincent, Grenada, Tobago, Trinidad, Colombia, Venezuela, Guyana, Brazil, Ecuador, Peru, Bolivia, Paraguay, and the northeastern tip of Argentina. It is found in a variety of vegetation types, but most frequently in evergreen or sub-evergreen forest, also occasionally in oak forest, pine forest, elfin forest, cloud forest, and dry forest, and from 0 to 1200 (rarely to 1800) m in Mexico, Central America, and the West Indies, but most commonly at 0–500 m in elevation (Figs. 4B, 7B, 8B).

IUCN Red List category. Assessed as Least Concern (LC) by IUCN (2012) criteria, *Gouania polygama* is very common in a variety of habitats from Mexico to Argentina and the West Indies.

Phenology. In Mexico, Belize, Guatemala, Honduras, and El Salvador, *Gouania polygama* has been collected in flower from September to November (rarely December to March, June, and August). In Nicaragua, Costa Rica, and Panama, flowering is known from October to February (rarely March, April, June, and September); in the West Indies, flowering is recorded from September to December (rarely January, March to June, and August).

Discussion. Most modern floras (Standley, 1923; Standley & Steyermark, 1949; Liogier, 1953b; Fernández, 1986, 1996; Johnston, 2001; Acevedo-Rodríguez, 2003) have separated *Gouania polygama* from *G. lupuloides* primarily on leaf pubescence. However, while throughout most of its range *G. polygama* tends to have the abaxial leaf surface covered with numerous spreading or kinky trichomes, and *G. lupuloides* tends to have the abaxial leaf surface with few appressed trichomes restricted to the venation, there are numerous exceptions. This has resulted in taxonomic confusion, misapplication of names, and the lack of recognition of additional species or, alternatively, the placement of *G. polygama* in synonymy below an extremely variable *G. lupuloides* (Nowicke, 1971; Liogier, 1982). Careful typification of these early names is of critical importance for their clear applications.

Jacquin (1760) published two species of *Rhamnus* without indication of types and with identical short descriptions, except that *R. polygama* was described as having tomentose leaves and *R. domingensis* as having glabrous leaves. The same author later (Jacquin, 1763) published the new genus, *Gouania*, with two species (*G. tomentosa* and *G. glabra*), explaining that they had been previously treated in *Rhamnus* (Jacquin, 1760); the one described with tomentose leaves, *G. tomentosa*, is equivalent to (but not superfluous for) *R. polygama*, as the name *R. polygama* was not explicitly cited in Jacquin (1763) (Art. 52.2, McNeill et al., 2012). The locality of both was indicated as "Domingensibus" (Jacquin, 1763: 264), and the species descriptions are not particularly helpful in distinguishing the two species or in fixing the application of the names. However, the genus description is clearly based on the first species, *G. tomentosa* (see discussion of derivation of genus name, above), with details (laciniate division of the disc and sub-rounded mericarp wings) that pertain, for the species found in Hispaniola, only to *G. polygama/tomentosa*. *Gouania glabra* is illustrated in a plate, but no illustration was provided for *G. tomentosa*.

In my search through the literature (Smith, 1819 [1811]; de Candolle, 1825; Reissek, 1861; Urban, 1921), I have found no reference to anyone actually having seen type material of *Rhamnus polygama/Gouania tomentosa*, and Bornstein (1989) indicated that type material was doubtfully preserved. I have seen only one specimen of *Gouania* from Jacquin's herbarium (BM-1030555). There is no indication of where it was collected, and the only writing on the front of the sheet is in pencil "*Gouania tomentosa* Jacq. Amer." and the number "11" (probably neither in Jacquin's hand). The back of the sheet is labeled in ink "Herbar. Dr. Jacquin." The specimen, consisting of one leaf with eight lateral veins on the left side of the midrib and seven on the right, is consistent with *G. polygama*, but inconsistent with *G. lupuloides* (lateral veins four or five, rarely three or six, per side of the blade midrib). If I knew that the

specimen had been collected in the West Indies, or that the only *Gouania* species in Jacquin's herbarium were *G. polygama* and *G. lupuloides*, I could state with little doubt that this is authentic material of *R. polygama*. As I cannot absolutely verify this, the sheet chosen as the lectotype of *R. polygama* (and *G. tomentosa*) is designated with reservations and an epitype is indicated. While "Domingensibus" (Jacquin, 1763: 264) could refer to either Haiti or the Dominican Republic, Jacquin seems to have collected only in Haiti (following Howard, 1973: 439, in Cap Français, Jacquesi, Leogane, Port au Prince, and Bayaha [an earlier name for Fort Liberté]). I have therefore selected as the epitype of *R. polygama* and *G. tomentosa* a fruiting collection from Haiti, *E. C. Leonard & G. M. Leonard 12661* (US), with duplicates at A and NY. The specimens are in agreement with the descriptions of Jacquin for *R. polygama* and *G. tomentosa*, and the older leaves match closely those of the lectotype. The fruits also match the plate in Gaertner of *G. tomentosa* (1805: tab. 183, fig. 1) cited by de Candolle (1825) and further provide consistency in the usage of the names. This follows the usage of those authors (Bornstein, 1989; Liogier, 1994; Krings & Braham, 2005) who have placed emphasis on mericarp shape and the presence of trichomes along the disc annulus, as retained on some fruits of the epitype.

There is a sheet (BM-956391) of *Gouania polygama* annotated by Maarten Christenhusz, 2008 "ex Herb. Jacquin, Type of *Gouania tomentosa* Jacq.," which bears two separate collections. The smaller one is labeled "St. Domingue" and consists of one leaf and a number of broken very young fruits, while the other specimen (which seems to be associated with the Christenhusz annotation) is much larger with numerous leaves and flowers in bud. The label indicates that it was collected around "Du Cap" and refers to a communication from Pavon upon the use of this species in Peru. This comment would date at least the label to, at the earliest, 1777 (after publication of both *Rhamnus polygama* and *G. tomentosa*). I have seen only an image of this herbarium sheet, but Jonathan Gregson, Collections Manager of Flowering Plants at BM, has informed me that there is nothing on either the front or back of the sheet to indicate that it was ever part of Jacquin's herbarium, and I cannot find a way to justify treating either of the specimens as authentic material of *R. polygama/G. tomentosa*.

Lamarck (1789: 5) published the name *Gouania crenata* Lam. as questionably separate from *G. tomentosa*, but with somewhat less pubescent leaves than those described by Jacquin. The description is strictly vegetative, as is the specimen presumed to be the holotype (the only collection labeled *G. crenata* at P-LA not seen, digital image!, with no other information on the label). There is nothing in the description or the image of the presumed type that would suggest this is not *G. polygama*. However, without any fertile material, and without knowing where it was collected (in protologue, Lamarck, 1789: 5, as "Amérique méridonale"), this name remains in doubt. De Candolle (1825) published *G. crenata* var. *cordifolia* based on *C. L. G. Bertero s.n.*, St. Domingo, a specimen that consists of two leaves, a tendril, and a small twig. I have seen an image of this and, as the leaf has seven lateral veins per side of the midrib, place it in synonymy of *G. polygama* (following Urban, 1921, and Suessenguth, 1953a).

Poiret (1811 [1812]) published *Gouania pubescens* with two varieties. For *G. pubescens* var. *pubescens*, he provided a description of a plant in flower and cited a specimen from Saint-Domingue (at Herb. Lamarck) and a plate in Lamarck, 1799 (t. 845, f. 1). I have chosen this specimen, of which I have seen a microfiche, as the lectotype. The flowering branch and magnified images of the flower in the Lamarck plate also pertain to the type variety. See the discussion of *G. lupuloides* regarding the placement of *G. pubescens* var. *martinicensis*. I place *G. pubescens* var. *pubescens* in synonymy of *G. polygama* (following Urban, 1921, and Suessenguth, 1953a).

Grisebach published the name *Gouania tomentosa* var. *pubescens* in 1860, without description, citing only the collection number, *C. Wright 75*, and while invalidly published, this name is sometimes seen in the literature and on herbarium specimens. I have seen a number of *C. Wright 75* sheets with various collection dates (Jan. 1859–July 1859; Sep. 1859–Jan. 1860; Sep. 1860; 1861), which are *G. polygama* and one sheet dated 1865 (after the publication of *G. tomentosa* var. *pubescens*), which is *G. lupuloides*.

Reissek (1861) published *Gouania virgata* with four syntypes (*R. H. Schomburgk 584* and *711* from Guyana, *E. R. Friedrichsthal*, without collection number, from Nicaragua, and *J. B. E. Pohl*, without collection number, from Brazil) and two varieties (*G. virgata* var. *brasiliensis*, with the adaxial leaf surface densely pubescent, and *G. virgata* var. *guianensis*, with the adaxial leaf surface sparsely pubescent), without indication of which syntypes pertained to which variety. He also cited the first publication of the name *G. virgata* as a nomen nudum from Guyana, in Schomburgk (1848 [1849]). From the latter it is assumed that the variety published as *G. virgata* var. *guianensis* is the type variety (*G. virgata* var. *virgata*) and that the lectotype for the species should be

selected from one of the Guyana collections. M. C. Johnston, in 1969, annotated the W-0031729 sheet of *R. H. Schomburgk 711* (Roraima, 1842–1843) as the lectotype of *G. virgata* var. *guianensis*. I have searched through the literature but have been unable to find publication of the lectotypification. I cannot follow Johnston's annotation, because there is no indication that Reissek ever saw this collection. It bears neither his annotation nor one of his illustrations. The same is true for the other material of *R. H. Schomburgk 711* that I have observed: BM (Roraima, 1842–1843, digital image!), K (1844)!, digital image!, G (Roraima, 1842–1843), F-neg. 23295!, digital image!, W-1889-0198876 (Roraima, 1842–1843), digital image!. The only material that I have seen from Guyana that is annotated as *G. virgata* in Reissek's hand is *R. H. Schomburgk 584* (collected June 1839), W-0031735 (digital image!), and this specimen is therefore selected as the lectotype. The other syntype of *G. virgata* var. (*guianensis*) *virgata* is *Friedrichsthal 646* (collected in Nicaragua in 1839, W-0031732!). It is clear that this sheet was studied by Reissek (and is therefore a syntype), as it bears his illustration and annotation. Two duplicates of this specimen (without collection number and without annotation in Reissek's hand) are also at W (W-0031730, digital image!, and W-0031731, digital image!). In addition to the presumed isosyntype *R. H. Schomburgk 711* (K) and the excellent illustration of the syntype *Friedrichsthal 646*, I have studied four actual specimens labeled *Schomburgk 584*, which are assumed to be duplicates of the lectotype; however, two have the date 1838 (BM-956387 and K), and two have no dates (F, K). This study, in addition to the examination of the digital image of the lectotype at W, supports placement of this name in synonymy of *G. polygama*.

The *Pohl* collection is most appropriately selected as the type of *Gouania virgata* var. *brasiliensis* as it is the only collection in the protologue cited from Brazil. Reissek (1861: 105) did not provide a collection number for the *Pohl* specimen in the protologue. However, he did cite the locality (as "Barra das Velhas ad ripas fluv. Rio de S. Francisco in prov. Minarum"), and I have seen a photo at F of a *Pohl* collection at W, and the digital image of the same (W-0041733), with the numbers *731* and *3107* with similar locality, "Barra das Velhas," and annotated in Reissek's handwriting, "*Gouania virgata* Reiss. β *brasiliensis*." Therefore, the *Pohl* specimen is chosen as the lectotype. One small deviation from the protologue is that variety *brasiliensis* was published as the α variety. The F sheet with the photo also has attached a large fragment from the W sheet. A digital image of a *Pohl* specimen at K with the number *731* and same locality, but not annotated by Reissek, was also observed. The W sheet of *J. B. E. Pohl 731(3107)* can safely be assumed to be the basis of *G. virgata* var. *brasiliensis*, and is selected as the lectotype. My examination of the fragment at F clearly supports placement of this name in synonymy of *G. polygama*.

As the focus of this paper is Mexico, Central America, and the Caribbean region, I have not attempted to provide a complete list of synonyms beyond that range; the *Gouania virgata* varietal names are included because of the citation of a syntype from Nicaragua. *Gouania virgata* is treated as an accepted species in the recent literature, including Berry and Steyermark (2007), Lima (2010), Boggan et al. (1997), Lima and Giulietti (2005), and Tortosa (1995). Escalante (1946) recognized both *G. virgata* and *G. polygama* (as *G. tomentosa*). However, the latter name must be misapplied, as it was characterized in the key with having a completely glabrous disc and was described as having a pubescent fruit. In addition, Escalante cited Jacquin, 1763: tab. 179, fig. 40, as this species, while Jacquin cited this for *G. glabra*. Tortosa (2008) placed *G. virgata* in synonymy under *G. lupuloides*.

Gouania mexicana was published by Sessé and Mociño in 1894, with a note at the end of the description indicating that Sessé and Mociño had originally (1887 [1888]) treated *Phylica scandens* Sessé & Moc. (see synonomy of *G. stipularis*) as including both a glabrous and tomentose form, with the tomentose form now (1894) being recognized as *G. mexicana* and the glabrous form as *G. domingensis* (see discussion under *G. stipularis*). McVaugh (2000) found two specimens (*3806* and *5202*) in the Sessé and Mociño herbarium at MA with the original label of *G. domingensis*, but no specimens with original labels of *P. scandens* or *G. mexicana*. I have seen F duplicates of both *3806* (in bud) and *5202* (in fruit), as well as the photos of the two sheets at MA and a digital image of *5202* (at MA). The specimens match the description of *G. mexicana*, and I consider the MA sheets of both to be authentic material of *G. mexicana*. The label of *G. domingensis* is not contradictory to this, given the history of Sessé and Mociño's treatment of these species. The F sheets of both are without doubt taxonomically recognizable as *G. polygama*. I select the MA sheet of the fruiting specimen (*5202*) as the lectotype of *G. mexicana*, as it can be identified with greater certainty from the photo (and digital image) than the specimen in bud, and place *G. mexicana* in synonymy under *G. polygama*. *Gouania mexicana* has been previously treated as a

synonym of *G. stipularis* (Standley, 1923; Sussenguth, 1953a, Fernández, 1986), which would be at odds with my selection of the lectotype. However, the placement of *G. mexicana* below *G. stipularis* to me seems unjustified, as *G. stipularis* consistently has glabrous or nearly glabrous leaves, whereas Sessé and Mociño described the abaxial leaf surface of *G. mexicana* as tomentose. The most remarkable feature of *G. stipularis* are its stipules, which Sessé and Mociño described for *P. scandens* and *G. domingensis* (sensu Sessé & Mociño, 1894), but not for *G. mexicana*. Both *3806* and *5202* have lost their stipules, as is usually the case in *G. polygama*. It should be noted that *Sessé & Mociño 5202b*, of which I have seen a digital image from MA and a duplicate at F, is a collection of *G. lupuloides* in flower. Neither specimen of *5202b* had any original label information or determination from Sessé and Mociño.

In North America, *Gouania polygama* in fruit is almost always very easy to recognize due to its small, nearly glabrous, dumbbell-shaped mericarps. However, the mericarps can on occasion be somewhat more pubescent with some trichomes found on the wings, as found on *Johnston 619* collected on San José Island in the Gulf of Panama. Most plants from South America with nearly glabrous, dumbbell-shaped mericarps are *G. polygama*, but there is another species, *G. alnifolia* Reissek, from Putumayo Department, Colombia (e.g., *Etienne s.n.*, CAS), eastern Ecuador (e.g., *Gudiño 532*, MO), Pando, Bolivia (e.g., *Jardim 1029*, MO), Rondônia Territory, Brazil (e.g., *Prance et al. 6238*, MO), and throughout Amazonian Peru (e.g., *Gentry 43562*, MO), which has similar shaped, glabrous mericarps. *Gouania alnifolia* differs in having very distinctive red rays on the inner surface of the mericarp wings and lacks trichomes along the disk annulus.

As previously mentioned, most modern floras have separated *Gouania polygama* from *G. lupuloides* primarily on leaf pubescence. Throughout most of its geographic range in Mexico, Central America, and the West Indies, specimens of *G. polygama* have leaves with the abaxial surface densely pubescent. However, abaxial leaf surfaces that are nearly glabrous, or with trichomes restricted to the venation, are typical from material on the Osa Peninsula of Costa Rica and in Panama in Colón, San Blas, Darién (excluding inlets on coast), Barro Colorado Island, and the southern part of the former Canal Zone. Leaf pubescence is more variable in the South American material. *Gouania lupuloides* can have the abaxial surface of the leaves varying from densely pubescent to glabrescent. In fact, in central Guatemala above 1000 m, the abaxial leaf surfaces of specimens of *G. lupuloides* are nearly always densely pubescent. *Gouania lupuloides* differs from *G. polygama* in having a glabrous disc annulus, disc lobes 1/5–2/5(1/2) the length of the sepals and butterfly-shaped mericarps. Sterile specimens can often be recognized based on the number of lateral veins and stipule retention: (three)four to six veins per side of the blade midrib and the stipules persistent in *G. lupuloides* versus (six)seven or eight(nine) lateral veins on either side of the midrib and the stipules caducous in *G. polygama*.

I have seen one collection from Veracruz, Mexico (*Purpus 15305*, F, GH), that is almost certainly a hybrid between *G. polygama* and *G. lupuloides*. It has in common with *G. lupuloides* the characteristics of leaves with four and five lateral veins per side of the midrib, retained stipules, and disc lobes as wide to twice as wide as long and 1/3 to 1/2 the length of the sepals; the *Purpus* collection shares with *G. polygama* its sessile flowers and the annulus with numerous trichomes. Three collections from Ixtapa, Chiapas (*Breedlove 11876*, F, LL, NY; *Laughlin 1625*, LL; and *Ton* [= *A. Méndez Girón*] *3355*, F, LL, MICH, MO, NY), are also probable hybrids of *G. polygama* and *G. lupuloides*. The three collections have in common with *G. lupuloides* the retained stipules, with the lower lobe wide oblong or reniform, but differ in the leaves with six and seven lateral veins per side of the midrib, as seen in *G. polygama*. The first two are mainly in bud, but have a few flowers; the disc lobes are similar to those of *G. lupuloides* in size and shape (ca. 1/3 sepal length and wider than long) but have a few trichomes along the annulus as in *G. polygama*). The last collection has nearly mature mericarps shaped like those of *G. lupuloides*. One flowering collection from the Dominican Republic (*Mejía & Pimentel B. 17293*, MO, NY, TEX) might also be a hybrid between *G. lupuloides* and *G. polygama*; it resembles *G. lupuloides* in all respects except for having trichomes along the disc annulus.

The name *Gouania polygama* has been frequently misapplied to all *Gouania* species (in Mexico, Central America, and the West Indies) that may have pubescent leaves, which would include *G. conzattii*, *G. croatii*, *G. ekmanii*, *G. eurycarpa*, *G. ferruginea*, *G. guiengolensis*, *G. pubidisca*, *G. rosei*, and *G. velutina*. See discussions under these species for the particular traits that can be used to separate them from *G. polygama*. The name *G. polygama* has also been misapplied to specimens of *G. obamana*, despite its nearly glabrous leaves (cf. discussion of *G. obamana* above).

Selected specimens examined. BELIZE. **Belize:** Churchyard Pine Ridge, Sibun River, *Gentle 1824* (A, F, K, MICH,

MO, NY); Sibun River, *Gentle 1444* (A, K, MICH, MO, NY, TEX, US). **Cayo:** Chaa Creek, *Arvigo & Cocom 696* (GH, NY, TEX), *716* (NY, TEX). **Corozal:** betw. Sarteneja & Chunox, *Davidse & Brant 32625* (MO, TEX). **Stann Creek:** Middlesex, *Schipp 472* (A, BM, F, G, GH, K, MICH, MO, NY). **Toledo:** near San Antonio, *Gentle 7549* (LL). COSTA RICA. **Alajuela:** Grecia, Los Angeles, camino de Los Angeles a la Laguna de Hule, *González & Perera 998* (MO); San Carlos, Betania de Cutris, *Carvajal V. 406* (MO, TEX). **Cartago:** Turrialba, P. N. Barbilla, Cuenca del Matina, sendero principal Río Dantas, *Mora C. 1790* (MO, NY); Turrialba, Distr. Santa Teresita, *Rivera 1816* (F, K). **Guanacaste:** rd. from Liberia to Hac. Santa María, Rincón de la Vieja Nat. Park, *Garwood et al. 678* (BM, MO); Tilarán, R. B. Monteverde, Cord. de Tilarán, Quebrada Grande, Río Chiquito, Caño Negro, Finca Rodolfo Quesada, *Bello & Cruz 5392* (CAS, MO). **Heredia:** La Selva Biol. Stat., *Folsom 9142* (GH, MO, TEX), Sendero Tres Ríos, *Wilbur & Moore 70292* (MO), OTS field stat., Río Puerto Viejo, *McDowell 1023* (F, MO, US); Sarapiquí, Chilamate, Finca El Bejuco, *Chacón 718* (F, MO, TEX). **Puntarenas:** Osa, Rancho Quemado, Rincón, *Quesada 421* (MO); Puntarenas, Cabo Blanco Nat. Res., S tip of Nicoya Peninsula, *Burger & Liesner 6666* (BM, F, US); Cordillera de Tilarán, Monteverde, cliff edge on Pacific slope, Bajo Tigre trail, *Haber & Zuchowski 10093* (MO, TEX). **San José:** San Francisco, *Donnell Smith 4763* (GH, M, US); Mora, Z. P. El Rodeo, bosque de la Univ. para la Paz, *Cascante 1245* (F, K, MO); Santa Ana, La Lindadora, Pozos, *Jiménez M. 3520* (F, NY). EL SALVADOR. **Ahuachapán:** San Francisco Menéndez, El Corozo, Mariposario, *Rosales 80* (BM, MEXU, MO). **San Salvador:** along rd. San Martín to Laguna de Ilopango, *Standley 22547* (US). GUATEMALA. **Alta Verapaz:** Cubilgüitz, *von Türckheim 7734* (US); Senahu, Finca Secacao, *Véliz Pérez 95.4394* (MO, TEX). **Chiquimula:** E portion of Vera Paz & Chiquimula, banks of Choco River, *Watson 45* (GH). **Escuintla:** near San José, *Standley 64031* (F). **Huehuetenango:** betw. villages of Nentón & Llano Grande, *Castillo Mont & Castillo Mont 1639* (F, GH, MO, NY, US). **Izabal:** vic. of Puerto Barrios, *Standley 24983* (US). **Petén:** Lacandon, *Contreras 3459* (DS, G, LL, US); Tikal, P. N., en camino a Uaxactún, *Tún Ortíz 10* (BM, MICH, US). **Quiché:** Finca Chailá, Zona Reyna, *Skutch 1796* (A, F). **Retalhuleu:** Retalhuleu, *Bernoulli & Cario 2048* (K). **San Marcos:** Finca El Porvenir, along Río Cabús on Potrero Matasán, Volcán Tajumulco, *Steyermark 37575* (A, F). **Santa Rosa:** Cuilapa, *Johnston 1090* (F). **Suchitepéquez:** Finca Mocá, *Skutch 2093* (A, BM, F, NY, US). HONDURAS. **Atlántida:** Lancetilla Valley, near Tela, *Standley 53753* (A). **Colón:** Trujillo, old rd. to Castilla, E of airport to Jericho, *Saunders 873* (BM, F, LL, MO, NY). **Comayagua:** Agua Caliente, vaguada de Ríos Chamo y Humuya, *Nelson et al. 6345* (MEXU, MO, TEX). **Cortés:** orilla del Río Humuya, 40 km N Santa Cruz de Yojoa, *Nelson et al. 5842* (MO, TEX); Santa Cruz de Yojoa, La Ceiba, orilla del Río Yure, *Nelson et al. 7417* (MEXU, MO). **El Paraíso:** Laguna La Presa de San Julián, *Midence 106* (MO). **Francisco Morazán:** above El Zamorano, vic. El Jicarito, *Standley 24872* (A, F). **Gracias a Dios:** rd. to Río Platano, *Wilson 529* (US); Brus Laguna, alrededores del Río Plátano, orilla del río, *Clewell & Cruz 4106* (MO, US); Puerto Lempira, orilla del Río Mocorón, *Nelson & Vargas N. 5071* (MEXU, MO, TEX). **Islas de la Bahía:** Roatán, N slope of mtn., *Barkley & Barkely 39672* (GH). **Olancho:** along Río Olancho, W of main Tegucigalpa–Catacamas Hwy., *Croat & Hannon 64065* (MO, TEX). MEXICO. **Campeche:** Calakmul, Pioneros del Río Xno-ha, *Martínez S. et al. 31773* (MEXU, MO). **Chiapas:** along rd. betw. Teneapa & Yajalón, *Nelson 3287* (GH, US); Zacualpa, *Woronow & Juzepczuk 1249* (F); Ocosingo, a 2 km SE de Nvo. Guerrero, camino Palenque–Boca Lacantum, *Martínez S. 14659* (F, GH, MEXU, MO); Ocosingo, en crucero de Lancanjá–Tzeltal, camino Nvo. Guerrero a Santo Domingo, *Martínez S. et al. 35165* (MEXU, MO; Fig. 2J); Ostuacán, El Chicho, on rd. from Río Copano betw. Pichucalco & Ostuacán, *Burnham 41* (BM, MO). **Hidalgo:** Jacala, Hidalgo–San Luis Potosí border, Km. 343–344 on hwy. below Chapulhuacan, *Moore 5042* (BM, GH, MEXU, MICH). **Oaxaca:** Pochutla, Cerro de Machete, *Reko 6113* (F); Tuxtepec, Chiltepec & vic., *Martinez Calderón 245* (A, LL, US). **Puebla:** Hueytamalco, 1 km hacia el NE de las instalaciones del Campo Exp. Las Margaritas, *Gómez C. & Goméz F. 261* (MEXU, MO). **Querétaro:** Landa de Matamoros, 1.5 km al O de San Onofre, *Rubio 1099* (MEXU). **San Luis Potosí:** Rascón, Río de las Gallinas, *Purpus 5407* (F, GH, MO, NY, US); La Conchita 2 km NE de Xilitla, brecha a Tlamaya, *Tenorio L. & Romero de T. 2481* (MEXU, MO). **Tabasco:** Balancán, Potrero Cercano al poblado el Triunfo, *Menéndez L. et al. 409* (MO); Teapa, 0.34 km al E de Chapingo, Univ. Autón. Chapingo, *Calónico S. et al. 21341* (BM). **Veracruz:** Martínez de la Torre, Coapa, *Ventura A. 20730* (MEXU, MO); Playa Vicente, *Martínez Calderón 2060* (GH, MEXU, MO); San Andrés Tuxtla, 34 km NE del Camino Catemaco–Montepio, *Cedillo T. 3528* (F, MEXU, MO, TEX). NICARAGUA. **Atlántico Norte:** Mt. Liveco, betw. Siuna & Madegrava, *Seymour 5075* (BM, F, GH, MICH, MO, NY, TEX); Bonanza, from mine Plantel ca. 1 km NE, *Stevens 18766* (MO, TEX). **Atlántico Sur:** Est. Exp. El Recreo, zona detrás de la Casa de Piedra y del Ranchón, *Ríos 299* (MO, TEX); vic. of Base Camp, ca. 3.6 km due SE of Cerro San Isidro, Río Kama, *Proctor et al. 27299* (F, NY, TEX, US). **Boaco:** Finca San Jorge, carr. Boaco–Río Blanco, ca. 7 km N de Boaco, *Soza et al. 429* (MO, TEX); 1 km W de San Lorenzo, *Moreno 18590* (MO, TEX). **Chinandega:** Volcán Chonco, *Moreno 25033* (MO). **Chontales:** 24.2 km NE of Villa Sandino along rd. to La Campana, Río Bulún, *Stevens & Montiel J. 30729* (MO); along rd. betw. Santo Tomás & Puente Los Hoyos, toward La Libertad, *Stevens et al. 21505* (MO, TEX). **Estelí:** Condega, Venecia, del alberque Cantagallo 250 m N, *Padilla G. 73* (MO). **Granada:** Isla Zapatera, Finca Garay, Ensenada Sonzapote, costado NE de la isla, *Grijalva P. 2042* (MO, TEX). **Jinotega:** al NE de Wiwilí, camino entre El Carmen y Wamblán, a lo largo del Río Coco, *Araquistain & Castro C. 1835* (MEXU, MO, TEX); along rd. from Hwy. 3 through La Fundadora, betw. La Salvadora & La Palestina, *Stevens & Grijalva P. 15405* (MO, TEX). **Madriz:** Telpaneca, San Jerónimo, *Cárdenas C. 93* (MO). **Managua:** carr. a San Francisco, Hac. San Antonio, *Moreno 5104* (MO, TEX). **Masaya:** Catarina, El Mirador, *Araquistain 412* (MO, TEX). **Matagalpa:** Puente Río La Ponzoña, along rd. W of Río Blanco, *Stevens & Montiel J. 30532* (MO); Río Bijao, near El Carmen, ca. 37 km NE of El Tuma, *Stevens & Moreno 19216* (MO). **Nueva Segovia:** Las Gallineras, orilla de Quebrada La Mula, *Moreno 5876* (MO, TEX). **Río San Juan:** El Castillo, Romerito, de la casa de Antonio Gómez, 600 m E, *Suazo 58* (MO); entrance to Palo Ralo near Acoyapa–San Carlos rd., *Stevens & Montiel J. 27835* (MO). **Rivas:** near Peñas Blancas, 1 km N of border with Costa Rica, *Moore 1829* (MO, TEX); Cárdenas, *Sandino 4096* (MO, TEX). PANAMA. **Bocas del Toro:** Old Bank Island, vic. of Chiriquí

Lagoon, *von Wedel 2045* (MO, NY, US); alrededores de Quebrada Chica, *Correa A. et al. 3816* (F, MO). **Canal Area:** near officer's club, Margarita, *Gentry & Tyson 4830* (MO); betw. Mount Hope & Santa Rita Trail, *Cowell 79* (NY); ca. 1 mi. SW of Cocoli in Rodman Naval Ammun. Depot, *Wilbur et al. 12907* (F, GH, MO, NY, TEX); Barro Colorado Island, laboratory clearing, *Croat 7105* (F, MO, NY). **Chiriquí:** ca. 2 mi. S of Puerto Armuelles, *Wilbur et al. 13578* (F, MICH, MO, TEX); David, *Roy 2* (MO, US). **Coclé:** vic. of El Valle, lower Río Antón, *Allen 103* (F, MO); hills S of El Valle de Antón, *Allen 2863* (F, MO). **Colón:** Chagres, *Fendler 108* (F, MO, US); ca. 1–2 km from Portobelo Hwy. up Río Guanche, *Knapp & Schmalzel 3624* (MO, TEX). **Darién:** Pueblo de Garachiné, carr. entre Garachiné–Sambu, *Duke 9274* (MO, US); trail betw. Cana & Boca de Cupe, vic. of El Real, along trail to Río Pirre, *Stern et al. 625* (MO, US). **Herrera:** Santa María, 5 km W of turnoff from Hwy. 105 to Potuga, *Hammel 5286* (MO). **Panamá:** San José Island, betw. Max Point & South Rd., ca. 55 mi. SSE of Balboa, *Johnston 1173* (BM, GH, MO, US), San José Island, N Loop rd., *Johnston 619* (BM); Panamá, Bella Vista, *Standley 25398* (F, MO, US). **San Blas:** Cangandí, *de Nevers & Herrera 5655* (MO, TEX); trail from dock at airport to Cangandí, *de Nevers et al. 6886* (MO, TEX). **Veraguas:** vic. of Santiago, *Allen 1078* (F, MO, US).

CUBA. **Camagüey:** vic. of La Gloria, *Shafer 60* (NY). **Cienfuegos [Santa Clara]:** Cieneguita, *Combs 93* (F, GH, K, NY, US); Guanaroca Island, betw. Punta Colorado & Rancho Luna, *Hatheway 1015* (B). **La Habana:** Santiago de las Vegas, *van Hermann 21* (BM, F, NY). **Matanzas**: near Matanzas, *Rugel 51* (BM, GH, MO, NY). **Pinar del Río:** betw. Río Cayaguateje & Sierra Guane, *Shafer 10465* (F, MO, NY, US). **Santiago de Cuba:** Morro rd., *Havard 3* (NY). DOMINICAN REPUBLIC. **Hato Mayor:** fuera de la Cueva de Arena, Caseta no. 1 del P. N. Los Haitises, frente a la Bahia de San Lorenzo, *Zanoni et al. 35923* (MO, NY, TEX). **Puerto Plata:** La Cumbre, *Ekman H16101* (LL, US). **San Cristóbal:** 2 km al N de Cambita Garabito, al Tablazo, *García et al. 5657* (F, MO). **Santiago Rodríguez:** Monción, *Valeur 251* (A, F, G, MICH, MO, NY, US). HAITI. **de Nord:** Mt. La Mine, vic. of St. Michel de l'Atalaye, *Leonard 7344* (GH, NY, US). **Nippes:** Massif de la Hotte, gr. Morne Rochelois, Miragoâne, rd. intersection of rte. 386 & 132, *Miller & Sherman 6603* (MO); San Germán, Bo. Rosario Alto, rd. S of 348, Km. 12.6 at Río Nueve Pasos, *Nee 44258* (MO, NY); prope Aguada, ad Río Grande, *Sintenis 5547* (BM, F, G, GH, M, MO, NY); prope Mayagüez in monte Mesa, *Sintenis 36* (BM, G, GH, K, M, NY, PR, US). TRINIDAD & TOBAGO. **Tobago:** Adelphi, *Broadway 3418* (F, G, MO). **Trinidad:** Oropuche Lagoon, *Britton et al. 1147* (GH); La Brea, main rd., *Broadway 9115* (BM, MO). WINDWARD ISLANDS. **Grenada:** Pointe Saline, *Beard 1328* (F). SAINT VINCENT AND THE GRENADINES. **St. Vincent:** rocky ground near sea on Leeward side, *Smith & Smith 1302* (BM, US).

ARGENTINA. **Misiones:** P. N. Iguazú, cataratas de Iguazú, *Vanni et al. 2765* (MICH). BOLIVIA. **Santa Cruz:** Andres Ibanez, llanura, at Jardin Bot. Santa Cruz, on rd. to Cotoca, *Nee 35270* (MO, NY); Ichilo, P. N. Amboró, 1–2 km NE of El Carmen on trail to crossing of Río Surutu, *Nee 41786* (MO, NY). BRAZIL. **Amazonas:** Rio Negro, flum. Solimões, *Spruce 1548* (BM). **Mato Grosso:** picadão que da acesso do Rio Juruena, *Rosa & dos Santos 2120* (MO). **Minas Gerais:** Viçosa, wagon rd. to São Miguel, ca. Km. 2, *Mexía 4625* (A, BM, G, MO); Viçosa, Agric. College lands, *Mexía 4495* (A, BM, MO); Brasília de Minas, *Claussen s.n.* [s.d.] (BM). **Pará:** upper Rio Cupary, plateau betw. Xingu & Tapajos Rivers, *Krukoff 1113* (BM, G). **Roraima:** Vista Boa Res. Ecol. Maracá, betw. Station & Maracá by Rio Urariquera, *Harley 24750* (K, NY). **São Paulo:** Mogi-Guaçu, Martinho Prado, Faz. Campininha, Res. Biol., Mata da Figueira, *Romaniuc N. & Rossi 1165* (F, NY); Luís Antônio, margens do Rio Mogi-Guaçu, *Leitao F. et al. 10101* (BM). COLOMBIA. **Antioquia:** 7 km from Turbo on rd. to Necoclí, *Gentry 9228* (MO). **Bolívar:** Santa Catalina, Loma Las Puas, via Arroyo Grande a Las Canoas, *Cuadros 3285* (MO). **Chocó:** Río Tolo, vic. Guayabal, SE de Acandí, *Quiñones et al. 15* (MO). ECUADOR. **Esmeraldas:** Atacames, betw. Atacames & Súa, *Webster 22835* (MO). **Guayas:** Guayaquil, Bosque Protect. Cerro Blanco, carr. a Salinas, Km. 15, *Rubio et al. 1798* (MO). GUYANA. NW slopes of Kanuku Mtns., in drainange of Moku-moku Creek (Takutu tributary), *Smith 3434* (B, MO). **Essequibo:** Rupununi area, Surama Village, *Acevedo-Rodríguez et al. 3363* (MO). **Rupununi:** Kuyuwini Landing, Kuyuwini River, *Jansen-Jacobs et al. 2376* (B, K). PARAGUAY. **Alto Paraná:** 4 km S de Hernandarias, selva marginal a la Represa Acaray, *Schinini & Caballero M. 27380* (MO); Est. Bertoni (Río Paraná), *Zardini & Florentín 40052* (MO, PY). PERU. **Amazonas:** Condorcanqui, Distr. El Cenepa, Región Nororiental del Marañon, Puerto Mori, Río Comaina, *Vásquez et al. 18917* (MO). **Cajamarca:** San Ignacio, San José de Lourdes, Crucero, *Campos 6156* (MO). **Huánuco:** W of Tingo María, *Schunke V. 5637* (MO, US). **Junín:** Yaupi, *Woytkowski 6510* (MO). **Loreto:** Alto Amazonas, Lagunas, *McDaniel & Rimachi Y. 16518* (MO). **San Martín:** San Martín, W side Río Huallaga, W of Shapaja 2–8 km on trail to Tarapoto, Cerros de Estoraqui, *Belshaw 3198* (MO). **Ucayali:** Coronel Portillo, Yarinacocha, near Pucallpa, *Gentry & Horna 29372* (MO). VENEZUELA. **Barinas:** Riberas del Río Caparo, *Stergios et al. 1781* (MO). **Bolívar:** Piar, Isla en el Lago de Guri, Sect. Danto Manchado, *Aymard et al. 10158* (MO, NY). **Mérida:** Barinas, near Barinitas, *Breteler 4408* (MO, NY). **Miranda:** along Quebrada Chaguarama, 0–4 km SW of Palo Quemado, *Liesner & González 9192* (MO). **Táchira:** arriba de Cementos Táchira hacia Borota, O de San Cristóbal, *Bono 4634* (MO). **Yaracuy:** San Felipe, *Curran s.n.* [28 Dec. 1952] (NY). **Zulia:** headwaters of Río Guasare, Serranía de Perijá, *Gentry 41203* (MO).

12. Gouania pubidisca A. Pool, sp. nov. TYPE: Nicaragua. Chinandega: Chinandega, 12 Jan. 1903, *C. F. Baker 152(673)* (holotype, MO!; isotypes, CAS!, GH!, MICH!, NY!, US [as 673]!). Figures 2K, 13A–D.

Diagnosis. New species similar to *Gouania rosei* Wiggins, but with the disc of the flowers pubescent and the mericarps larger with their inner surfaces drying with the fruit bodies only slightly darker than the wings.

Liana; young branches solid, densely tomentose, or tomentose with additional scattered spreading trichomes, trichomes white, yellow or light red-brown. Leaf blades 4.5–10 × 3–8 cm, ovate or elliptic, membranaceous, adaxial surface drying dark green to dark brown-green, abundantly to sparsely tomentose

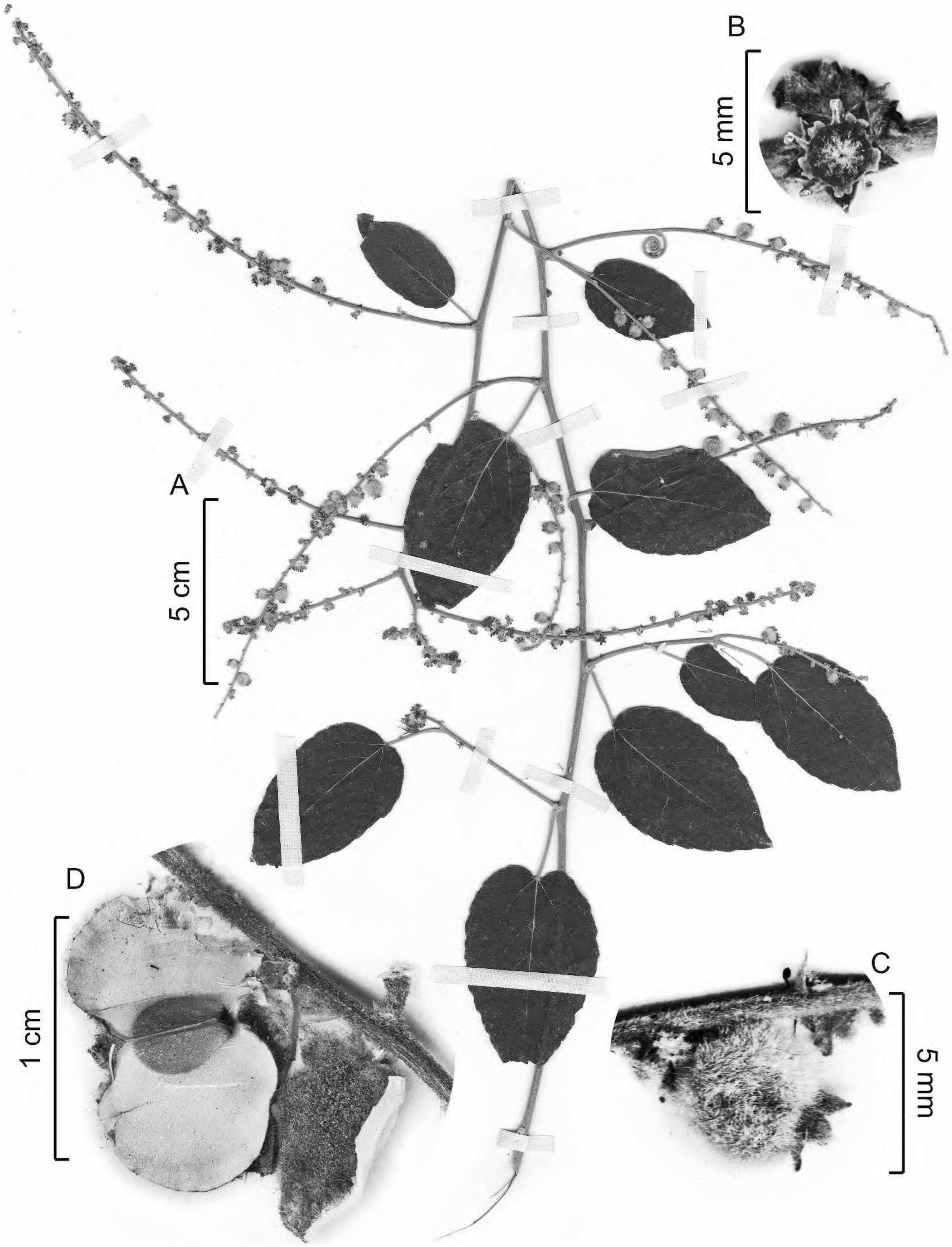


Figure 13. *Gouania pubidisca* A. Pool. —A. Fertile branch with flowers and young developing fruits. —B. Flower at inflorescence node. —C. Young developing fruit. —D. Fruiting node of infructescence with open fruit. A–C scanned from the isotype *C. F. Baker 152 (673)* (NY); D scanned from the paratype *O. Téllez V. 11283* (MO).

with trichomes 0.2–0.5 mm, white, abaxial surface drying light yellow-green often with starkly contrasting black marginal glands, densely pilose to tomentose with trichomes 0.25–0.75 mm, spreading and matted, white or yellow-white, lateral veins 5 or 6(7) per side of midrib, diverging at 45°–60° angles, base cordate, subcordate or rounded, margin crenate or crenulate, 1 to 2 teeth/cm, tooth glands pustular to slightly pulvinate, apex acute-apiculate or obtuse-apiculate (rarely acuminate); stipules unlobed or with small foot, usually caducous, 1.5–4 × 0.5–1.25 mm, erect usually tightly appressed, ovate (rarely lanceolate), acute (rarely acuminate), foot (if present) 0.2–0.75(1.5) × 0.1–0.25 mm, curving downward, ovate (rarely subulate), acute; petioles 5–20 mm. Inflorescence with longest racemiform part 15–28 cm, indumentum of rachis similar to that of young branches, bract of cyme 1.25–3 mm, lanceolate or ovate, acuminate, cymes appearing sessile, mature flowers appearing sessile to pedicels to 0.5 mm, hypanthium and sepals externally densely pilose with trichomes yellow or yellow-white; sepals 0.75–1.1 mm; petals 0.6–0.9 mm; stamens with filaments 0.35–0.6(0.7) mm, anthers 0.15–0.25(0.3) mm; disc excluding lobes 0.9–1.6 mm diam., entire disc, excluding lobes, pubescent to trichomes distributed only along annulus and in lines, long to short, radiating from annulus, disc lobes ca. 0.15–0.3 × 0.3–0.7 mm at apex, transversely rectangular, generally apically bilobed, 1/5–1/3 length of sepals; style glabrous or pubescent. Young fruits densely velutinous, trichomes yellow or yellow-white; mature mericarps butterfly-shaped (Fig. 2K), the wings attached to apex and base of fruit body as well as sides, externally drying green-brown to light yellow-brown, darker over fruit body, abundantly pilose to velutinous with trichomes 0.25–0.5 mm, white to light red-brown, internally drying yellow-white or yellow-green on wings, contrasting only slightly with somewhat darker or red-tinted fruit body, sometimes pale red along margin of fruit body or an additional concentric pale red ring on wings, fruit body 4–7 mm high, wings 7–10 mm high, distance between highest points of 2 wings 4–7 mm, width of mericarp 10–14 mm, 2–2.5× height of fruit body, width of fruit body 3–3.2 (3.75) mm, 1/5–1/3 width of mericarp; seeds 2.5–3.25 × 1.6–2.75 mm, shiny brown.

Habitat and distribution. *Gouania pubidisca* is known from Pacific Mexico (Nayarit, Guerrero, Oaxaca, and Chiapas), central Guatemala (Dept. Guatemala), El Salvador, and Pacific Nicaragua (Chinandega, Managua, and Granada). It has been found in deciduous forests, at 40–1000 m elevation (Fig. 4A).

IUCN Red List category. Assessed as Data Deficient (DD) by IUCN (2012) criteria, *Gouania pubidisca* is known from only 29 collections scattered in dry deciduous forests from Nayarit, Mexico, to Granada, Nicaragua, between 40 and 1000 m elevation. The species has an estimated area of occupancy of 96 km² and, as 71% of its collections fall outside of protected areas, further study is strongly recommended to determine its conservation status.

Phenology. *Gouania pubidisca* has been collected in flower from August to February.

Discussion. *Gouania pubidisca* is most similar to *G. rosei* of Pacific Mexico (Baja California Sur, Sonora, and Chihuahua south to the Tehuantepec District of Oaxaca), with which it can be confused when sterile or in flower. *Gouania rosei* differs in having the floral disc totally glabrous or with trichomes restricted to the annulus, the ratio of disc lobes to sepals 1/3–2/5(–1/2), and smaller mericarps (height of wings 4–6 mm and width of mericarp 6–9 mm), with the inner surface strongly bicolored. In addition, the leaves of *G. pubidisca* tend to dry bicolored, with the adaxial surface drying much darker than the abaxial surface, while in *G. rosei* both surfaces dry yellow-green. Most specimens of *G. pubidisca* have been misidentified as *G. polygama* (Oaxaca, Mexico, to South America and West Indies), which differs in having the trichomes of the floral disc restricted to the annulus, the disc lobe to sepal ratio (1/3–)2/5–3/5(–2/3), disc lobes often apically tapering and the mericarps dumbbell-shaped and glabrous. Fruiting specimens of *G. pubidisca* can be confused with *G. velutina*. However, even in fruit *G. velutina* usually retains some of its stipules (lower lobe orbicular to reniform and 4–11 mm wide) and some of the sepals and disc lobes (disc lobes lanceolate and acuminate and 1/2–1× length of sepals). The mericarps of *G. velutina* are also nearly truncate apically, and the internal surfaces have red lines radiating from the fruit body. Following the work of Reissek (1861) and Suessenguth (1953a), *G. pubidisca* would belong to their section I, characterized by the pubescent floral disc. The only other species from Central America in this section would be *G. hypoglauca*, which is easily distinguished from *G. pubidisca* by the unusual indumentum of its abaxial leaf surface.

The paratype *Soeharto et al. 7237* (in fruit) differs from all the other known fruiting collections of *Gouania pubidisca* in having only a few trichomes retained on the floral disc.

Paratypes. EL SALVADOR. **Ahuachapán:** San Benito, Peña los Escobos, *F. Chinchilla P. s.n. (ISB-00696)* (B, F, MO); San Francisco Menéndez, El Corozo, Mariposario, *J. M. Rosales 1645* (B, BM, MO), *J. M. Rosales 2441* (MO); Finca Santa Lina, ca. 6 km al S de Ahuachapán, *J. L. Linares & C. A. Martínez 2013* (MEXU). **La Unión:** San Carlos, Golfo de Fonseca, *G. W. Barclay 2665* (BM, K). **Santa Ana:** a la orilla de la carr. a Metapán, entre la Hda. El Milagro y la Hda. San Cayetano, *J. L. Linares & C. A. Martínez 849* (MEXU); Metapán, P. N. San Diego-La Barra, *D. Rodríguez & A. Tejada 2133* (MO). GUATEMALA. **Guatemala:** Palencia, on rd. Guatemala City–El Progreso, Km. 30, *D. D. Soejarto et al. 7237* (F). MEXICO. **Chiapas:** carr. Acapethua–Acacoyagua, Soconusco, *A. Aquino 207AA* (MEXU); Arriaga, *C. D. Mell 2184* (NY, US); Cintalapa, 5 km W of Rizo de Oro, *D. E. Breedlove 36724* (MO); Escuintla, Mt. Ovando, *E. Matuda 17046* (F, MEXU); Motozintla, 25–27 km NE of Huixtla along rd. to Motozintla SW of Tolimán, *D. E. Breedlove 28594* (LL, MO); Tonalá, en las cercanias de la zona arqueologica Iglesia Vieja, *L. O. Alvarado-Cárdenas & A. Reyes-García 745* (MEXU, MO); Paderon [Paredón], Tonalá, *E. Matuda 16966* (F, MEXU). **Guerrero:** Atoyac–San Juan, *G. B. Hinton & J. C. Hinton 10926* (GH, K, US). **Nayarit:** Compostela, camino de terracería de Valle de Banderas a El Coatante, *O. Téllez V. 11283* (MEXU, MO). **Oaxaca:** Juquila, 2–10 km N of Puerto Escondido, *R. McVaugh 22445* (MICH); Distr. Tamiltepec [Jamiltepec], Huazolotitlán a Collantes, *C. Conzatti 4402* (MEXU), *4407* (MEXU, NY); Juchitán, Mpio. de Asunción Ixtaltepec, *E. E. Lebrija T. & E. A. Pérez G. 42* (MO); Tehuántepec, El Manguito, al sur de El Limón, *R. Torres C. 4170* (MEXU, MO). NICARAGUA. **Chinandega:** Mpio. Chinandega, falda de Volcán Casita, entrada Los Laureles, Hacienda Versalle, *I. Coronado G. & J. Reyes 6462* (MO). **Granada:** Granada, *P. Lévy 378* (G); Volcán Mombacho, 1 km al este de La Luz, *P. P. Moreno & J. C. Sandino 6488* (MEXU, MO, TEX), W slope of Volcán Mombacho, along rd. to Finca La Luz, 2 km E of (above) last fork, *W. D. Stevens & O. M. Montiel J. 33195* (MO; Fig. 2K). **Managua:** Cuatro Esquinas de Ticuantepe, camino entre Santo Domingo y Las Nubes, *P. P. Moreno 4383* (MO, NY, TEX).

13. Gouania rosei Wiggins, Contr. Dudley Herb. 4: 20. 1950. Replaced name: *G. mexicana* Rose, Contr. U.S. Natl. Herb. 3: 314. 1895, non *Gouania mexicana* Sessé & Moc., Fl. Mexic., ed. 2: 236. 1894. TYPE: Mexico. [Sinaloa]: Culiacán, 27 Aug.–25 Sep. 1891 [27 Aug. to 15 Sep. 1891, GH, MICH, US labels], *E. Palmer 1491* (lectotype, designated here, US-235108!, digital image 00094523!; isolectotypes, GH!, MICH!, US-235109!, digital image 00094522!, US-1491573, digital image 00901591!). Figure 2L.

Liana; young branches solid, abundantly to densely tomentose or pilose or tomentose with several longer, spreading trichomes, trichomes white, yellow-white or white with scattered light red-brown trichomes. Leaf blades 4.2–13 × 2–8 cm, elliptic, oblong, or ovate, membranaceous, both surfaces drying yellow-green, densely to abundantly pilose (sometimes with age trichomes sparse above and scattered below) with trichomes 0.1–0.5 mm, kinky, white, lateral veins (4)5 to 7 on either side of midrib, diverging at 45°–70° angles, base cordate, subcordate, or rounded, margin crenate or crenulate to nearly entire, 1 to 2 teeth/cm, tooth glands pulvinate to cupular, apex acute to acuminate (rarely obtuse to rounded); stipules unlobed (rarely with subulate foot), generally caducous, 1.75–5 × 0.5–1 mm, erect, lanceolate, acuminate, the tip sometimes long extended and flexuous, foot (if present) 0.5–1 × 0.05–0.1 mm, curving downward, subulate; petioles 5–20 mm. Inflorescence with longest racemiform part 5.5–16(20) cm, indumentum of rachis similar to that of young branches, bract of cyme 1–4.5 mm, lanceolate or narrowly triangular, acuminate, cymes appearing sessile, mature flowers appearing sessile to pedicels to 0.5(0.75) mm, hypanthium and sepals externally abundantly to densely sericeous with trichomes white or yellow-white; sepals 0.6–1.3 mm; petals 0.6–1.1 mm; stamens with filaments 0.5–0.75 mm, anthers 0.15–0.3 mm; disc excluding lobes 1–2 mm diam., annulus glabrous or with few to numerous trichomes, disc otherwise glabrous, disc lobes 0.2–0.4(–0.5) × (0.15–)0.25–0.5(0.7) mm at apex, transversely rectangular, square, or slightly narrowed apically (rarely lanceolate and acuminate), generally apically bilobed, 1/3–2/5(–1/2) length of sepals; style usually pubescent. Young fruits densely to abundantly velutinous to pilose, trichomes yellow-white; mature mericarps butterfly-shaped (Fig. 2L), the wings attached to apex and base of fruit body as well as sides, externally drying yellow-brown or yellow-green, darker over fruit body, densely to abundantly sericeous to pilose (or sometimes trichomes scattered on wings) with trichomes 0.2–0.75 mm, white, internally drying yellow-white on wings, contrasting markedly with dark red-brown fruit body, fruit body 4–5 mm high, wings 4–6 mm high, distance between highest points of 2 wings 3–5(6) mm, width of mericarp 6–9 mm, 1.25–2× height of fruit body, width of fruit body (2.5–)3–4 mm, (1/3)1/2 width of mericarp; seeds 2.5–3.5 × 1.9–2.6 mm, shiny brown.

Habitat and distribution. *Gouania rosei* is known from Pacific Mexico, near the tip of Baja California Sur, and from Sonora and Chihuahua south to the Tehuántepec District of Oaxaca. The species is found in subdeciduous, deciduous, and thorn forests, at 0–750(–1330) m elevation (Fig. 5A).

IUCN Red List category. Assessed as Data Deficient (DD) by IUCN (2012) criteria, *Gouania rosei* is known from 130 specimens from Pacific Mexico and has an estimated area of occupancy of

almost 400 km². Because the species is restricted to dry to very dry habitats and 70% of its area of occupancy is in unprotected areas, further study is recommended to establish its conservation status.

Phenology. *Gouania rosei* has been collected in flower from August to October.

Discussion. *Gouania mexicana* was published by Rose (1895), based on the two syntypes: *Palmer 1491* and *Palmer 1694*. The specimen *Palmer 1491* (US-235108) has the most diagnostic features of the species, with the mericarps small, pubescent and internally drying bicolored, and the small, unlobed stipule. The US sheet (US-235108) is hand-annotated by Rose on the lowermost left-hand label, and therefore *Palmer 1491* is here selected as the lectotype for *G. mexicana* and its replacement name, *G. rosei*.

Gouania rosei is very easily recognized in fruit, but *G. pubidisca*, *G. lupuloides*, *G. conzattii*, and *G. polygama* all have geographic distributions that overlap with *G. rosei* and may be confused with *G. rosei* when fruits are absent. See the discussions under *G. pubidisca* and *G. conzattii*. Both *G. lupuloides* and *G. polygama* differ from *G. rosei* in their bilobed stipules and nearly glabrous mericarps with the inner surface only slightly darker over the fruit body; additionally the mericarps of *G. lupuloides* are usually larger than those of *G. rosei*, with the width of the mericarp (8)9–16 mm and height of wings (5)6.6–12 mm; those of *G. polygama* are dumbbell-shaped versus butterfly-shaped in *G. rosei*. *Gouania lupuloides* never has trichomes on the floral disc annulus and usually has longer pedicels in flower ([0.5–]1–3[–4] mm) than *G. rosei*. *Gouania polygama* overlaps geographically with *G. rosei* only in Oaxaca and has a larger disc lobe to sepal ratio, (1/3–)2/5–3/5(–2/3), with the disc lobes often apically tapering.

Selected specimens examined. MEXICO. **Baja California Sur:** La Hiedra, near headwaters of arroyo NW of El Encinal, *Carter & Chisaki 3468* (B, BM, MEXU, MICH, MO, NY, TEX, US), *3590* (BM, MEXU, MICH); 1 mi. N of Rancho El Aguaje, SSE of Pescadero, *Moran 19034* (GH, LL, MICH, MO; Fig. 2L, US); La Paz, S side of Arroyo de León, *Wiggins et al. 500* (US); 6–10 mi. SE of Todos Santos–Cabo San Lucas Hwy. on small rd. to Rancho La Burrera, *Breedlove & Axelrod 43216* (MEXU). **Chihuahua:** Río Aros, in canyon, *LeSueur 1252* (F, TEX); Guasaremos, Río Mayo, *Gentry 2378* (F, K, MEXU, MO). **Colima:** along Hwy. 80, 6.6 mi. by rd. SE of El Colomo, *Breckon et al. 1094* (F, GH, TEX); Manzanillo, *Ferris 6052* (A, US); Tecomán, La Salada, 21 km SE de Colima, carr. Colima–Manzanillo, *Santana M. 918* (MEXU). **Guerrero:** Acapulco & vic., *Palmer 103* (A, F, GH, MICH, MO, NY); Atoyac de Alvarez, a 4 km al NE de Atoyac camino a Paraíso, *Soto N. 11696* (MEXU, US); Coyuca de Benítez, *Meza A. 113* (MEXU); Petatlán, 9 km al NO de la desv. a El Camalote, *Soto N. et al. 5972* (MEXU, TEX). **Jalisco:** La Huerta, Rancho El Paraíso, *Lott & Solís M. 641* (MEXU, TEX); La Huerta, Cumbres section of Rancho Cuixmala, *Lott et al. 2899* (MEXU, MICH, NY); La Huerta, Rancho la Mesa y Carrizalillo, *Flores et al. 3024* (MICH, TEX); La Huerta, Chamela, camino entrada, *Ayala 204* (F, MEXU, MO, TEX); La Huerta, Rancho Cuixmala, *Ayala 1121* (MICH, MO). **Michoacán:** Cerro Zinaparo, 3.5 km SE de Churintzio, *Trejo 2524* (MEXU). **Nayarit:** P. H. Aguamilpa, *Flores F. et al. 2941* (MEXU, MICH, MO); Nayar, 8 km NW de San Juan Peyotán, *Flores F. & Tenorio L. 1203* (MEXU, MICH, MO); Nayar, 3 km S de San Juan Peyotán, *Flores F. & Ramírez R. 2675* (MEXU, MICH, MO); Santa María del Oro, 19 km E de San José de Mojarras, *Ramírez R. & Flores F. 698* (MEXU, MICH, MO). **Oaxaca:** Pochutla, Mpio. Santa María Huatulco, *Sánchez M. & Nava Zafra 513* (MEXU); Pochutla, Mpio. Santa María Huatulco, *Nava Zafra et al. 1313* (MEXU); Tehuántepec, Mpio. de Santiago Astata, Tapanalá, *Castrejón R. et al. 976* (MEXU, MO); Tehuántepec, Mpio. de Santiago Astata, Barra de la Cruz, Laguna del Potrerón, *Elorsa C. 2398* (MEXU, MO); Tehuántepec, Mpio. Santiago Astata, Barra de la Cruz, *Elorsa C. 991* (MEXU, TEX). **Sinaloa:** [Imala] "Ymala," *E. Palmer 1694* (syntype, US; isosyntype, GH); Cerros de Navachiste ca. Bahia Topolobampo, *Gentry 14326* (MEXU, TEX, US); ca. 2.6 mi. from Hwy. 15 along rd. to microwave tower, ca. 17 mi. SE of Emcosa, *Stevens & Fairhurst 2047* (GH, MO, TEX); a 56 km de Badiraguato rumbo a Surutato, *Vega A. et al. 2466* (MEXU); Culiacán, Tacuichamona, *Valverde R. 160* (MEXU); Culiacán, poblado de Jesus María y cercanias de la Presa Adolfo López Mateos (El Varejonal), *Vega A. et al. 3294* (MEXU); Rosario, Cacalotan, El Habal, *González Ortega 924* (MEXU). **Sonora:** Sierra Bojihuacame, SE of Cd. Obregón, *Gentry 14493* (LL, US); Alamos, *Palmer 676* (F, GH, MEXU, NY); Bacadéhuachi, *Hartman 258* (GH); Navojoa, Ejido Francisco Solis, 7 km (by air) ENE of Est. Luis, *van Devender et al. 98–2115* (MEXU, NY); small arroyo 10 mi. NW of Ures, *Wiggins 7350* (MICH).

14. Gouania stipularis DC., Prodr. 2: 39. 1825. *Phylica scandens* Sessé & Moc., Pl. Nov. Hisp. 39. 1887 [1888]. TYPE: Mexico. Michoacán: [Apatzingán] "Apatzingam" (from Sessé & Mociño, 1887 [1888]), *Torner Collection no. 0989* [= *Hunt Institute 6331.0989*: the plate numbered by Sessé & Mocino as *441* of "Ic. Fl. Mex."] (holotype, *Torner Collection no. 0989* not seen, digital image! [lectotype for *P. scandens* designated by McVaugh [2000: 452], *Torner Collection no. 0989*]). EPITYPE: Mexico. Jalisco: Mpio. La Huerta, 0.9 km de la carr. Puerto Vallarta–Barra de Navidad, ca. 7 km al SE de la Est. Biol. Chamela, sobre el camino a "El 25" (IMSS Comun.), Careyes, 27 Oct. 1981, *E. J. Lott & J. A. Solís M. 622* (epitype, designated here, MEXU!; isoepitypes, MICH!, MO!, TEX!). Figures 1H, 2M.

Gouania pallida Rose, Contr. U.S. Natl. Herb. 5: 138. 1897. TYPE: Mexico. Guerrero: Acapulco, Dec. 1895 [Oct. 1894–Mar. 1895, A, BM, F, GH, K, MO, NY, US

labels], *E. Palmer 228* (holotype, US!; isotypes, A [as *238*, corrected to *228*]!, BM [as *238*]!, F!, GH!, K [as *238*, corrected to *228*]!, MO [as *238*, corrected to *228*]!, NY [as *238*]!, US [as *238*, corrected to *228*]!).

Liana; young branches solid, glabrous. Leaf blades 7–15 × 3.1–8.5 cm, elliptic, membranaceous, both surfaces green, glabrous or with few trichomes on venation 0.25–0.5 mm, appressed, white to red-brown, lateral veins (5)6(7) per side of the midrib, diverging at 30°–45° angles, base cordate to subcordate (rarely inaequilaterally truncate), margin crenate or crenulate (rarely serrate), 1 or 2 teeth/cm, tooth glands cupular (rarely pulvinate), apex acuminate; stipules 3-lobed (Fig. 1H), at least some retained into mature fruit, upper lobe 8–15 × 10–30 mm, curving downward (rarely ascending), foliaceous, reniform, rounded, middle lobe 3–8 × 0.75–3 mm, curving upward (at least at tip), lanceolate, acuminate, lower lobe 5–12 × 6–12 mm, curving downward, foliaceous, orbicular to wide spatulate, rounded; petioles 10–30 mm. Inflorescence with longest racemiform part 15–29 cm, rachis sericeous to pilose with trichomes white, yellow, or ferruginous, bract of cyme 2.25–4.5 mm, variously 3-lobed and similar to stipules or unlobed and oblong-rounded to ovate, acute or lanceolate, acuminate, cymes usually appearing sessile but peduncle on occasion developing to 10 mm, mature flowers with pedicels 2–3.5 mm, hypanthium and sepals externally sparsely to densely sericeous with trichomes white to yellow-brown, sometimes mixed with ferruginous; sepals (0.75)0.9–1.3 mm; petals 0.75–1.2 mm; stamens with filaments 0.6–1 mm, anthers 0.25–0.35 mm; disc excluding lobes 1.2–1.7 mm diam., glabrous, disc lobes 0.1–0.35 × 0.5–0.9 mm at apex, transversely rectangular, generally apically bilobed, 1/10–1/4 length of sepals; style glabrous. Young fruits with few appressed to spreading trichomes, white or white and ferruginous; mature mericarps butterfly-shaped (Fig. 2M), the wings attached to apex and base of fruit body as well as sides, externally drying yellow-brown, darker over fruit body, glabrous or with few scattered trichomes near apex of fruit body, ca. 0.2 mm, white, internally drying yellow-white on wings usually contrasting markedly with medium to dark brown (rarely light brown) fruit body, fruit body 4–6 mm high, wings 5–7 mm high, distance between highest points of 2 wings 4–6 mm, width of mericarp 6–11 mm, 1–2× height of fruit body, width of fruit body 3–4.5 mm, 1/3–1/2 width of mericarp; seeds 3.1–3.5 × 2–2.75 mm, shiny brown.

Phenology. *Gouania stipularis* has been collected in flower from October to June, with a primary anthesal peak in October and November and a secondary peak in March.

Habitat and distribution. *Gouania stipularis* is known from Pacific Mexico from Nayarit to the northern border of Oaxaca. It is found in subdeciduous or deciduous forests or thickets, at 0–1100 m elevation (Fig. 4B).

IUCN Red List category. Assessed as Data Deficient (DD) by IUCN (2012) criteria, *Gouania stipularis* is known from 36 collections from the dry forests of Pacific Mexico. It has an estimated area of occupancy of 116 km² and, with 65% falling in unprotected areas, further study is recommended to establish its conservation status.

Discussion. De Candolle published *Gouania stipularis* citing "fl. mex. ic. ined." (de Candolle, 1825: 39). Alphonse de Candolle (1874: index, page 3) indicated as the type of *G. stipularis* the plate of "Icones florae mexicanae ineditae" (de Candolle, 1874: introduction) that was the source of the tracing number *178* (Calques des Dessins). Tracing number *178* is a copy of the original plate *441* of Sessé and Mociño (de Candolle, 1825: 39) "Fl. mex. ic. ined." The original plate *441* (plate number *0989* of the Torner Collection) is annotated in Augustin de Candolle's handwriting as "*Gouania ? stipularis*" and was apparently the only material de Candolle had available to him of this species, and is therefore the holotype (cf. Art. 9.1, McNeill et al., 2012). Sessé and Mociño, 1887 (1888: 39), also cited plate *441* for *Phylica scandens*, and McVaugh (2000), finding no specimens in the Sessé and Mociño herbarium with this name, selected this plate as the lectotype of *P. scandens*.

Unfortunately, the Torner plate is more artistic than informative, particularly with respect to the stipules. Some of the stipules in the plate are fused and amplexicaule, while others are separate and widely ovate. None are reniform as described by Sessé and Mociño. The stipules of *Gouania stipularis* are 3-lobed, with two lateral large lobes, one reniform and one more or less orbicular to broadly spatulate, and a small lanceolate central lobe. To assist in the application of the names *G. stipularis* and *Phylica scandens*, a flowering specimen at MEXU, *Lott & Solís M. 622*, is chosen as the epitype, with duplicates at MICH, MO, and TEX.

The name *Phylica scandens* was replaced in Sessé and Mociño (1894) by *Gouania domingensis* and *G. mexicana* (for the latter, see the discussion below *G. polygama*). The diagnosis of *G. domingensis* used here by Sessé and Mociño (1894: 69) is identical to

that used previously for *P. scandens* (excluding citation of the icones number), and while the description differs in wording, it referred to essentially the same taxon. I believe (as did McVaugh, 2000) that Sessé and Mociño were here misapplying *G. domingensis* L. (see discussion under *G. lupuloides*) and not publishing a new species (as interpreted by Nelson, 1997).

Rose (1897) published *Gouania pallida*, separating it from *G. stipularis* based on differences in stipule shape, leaf base and margin, and raceme length. The type of *G. pallida* fits within the taxonomic concept of *G. stipularis* here employed, and is therefore placed in synonymy under that name. The type was cited by Rose as *E. Palmer 228*, Acapulco, December 1895, and the holotype at US is labeled accordingly (but with the date as October 1894 to March 1895). However, the isotype at US was originally numbered as *238*, with a *2* written over the *3*. A number of the duplicates were distributed with the *238* number corrected to *228* or, in the case of the MO sheet, with a note saying it should be corrected. The BM and NY sheets are assumed also to be correctable to *228*.

Gouania stipularis is easily recognized by its 3-lobed stipules, with the lateral lobes large and foliaceous. However, specimens of *G. lupuloides*, which has bilobed stipules, can on occasion have the lower lobe large and foliaceous (Fig. 1F), and these specimens are sometimes misidentified as *G. stipularis*. Hemsley (1879) cited *Linden 893* (K not seen), from the Yucatan Peninsula, as *G. stipularis*, and Standley (1930) included *G. stipularis* as from the Yucatan Peninsula, based on a *Linden* specimen (without collection number), but suggested that the locality of that collection was doubtful. I have not seen *Linden 893*, believed to be at K, but not included in their loan to me, nor have I seen *G. lupuloides* with foliaceous stipules from the Yucatan Peninsula. However, J. J. Linden visited Veracruz on the same expedition that took him to the Yucatan Peninsula, sailing from the port at Veracruz to Campeche (Ceulemans, 2006), and specimens of *G. lupuloides* with the lower lobe of the stipules large and foliaceous are known from Veracruz, so *Linden 893* is perhaps a mislabeled specimen of *G. lupuloides* from Veracruz. Suessenguth (1953a) also cited *G. stipularis* from the Yucatan Peninsula, presumably from Standley (1930). Fernández (1986) treated *G. stipularis* from Veracruz based on *Calzada 1684* (MEX, XAL) and *Perino 3218* (CHAPA, ENCB, MEXU, NY). I have examined duplicates of *Calzada 1684* (BM, F, MEXU, Fig. 1F) and *Perino 3218* (MEXU, NY), and both are *G. lupuloides*.

A few specimens of *Gouania stipularis* (such as *Martínez S. et al. 4406*) have lost all their stipules, and these are difficult to separate from *G. lupuloides* because they overlap in most other characteristics. However, *G. stipularis* can usually be separated from *G. lupuloides* by the combination of glabrous young branches (vs. pubescent), nearly glabrous leaves (vs. variable in *G. lupuloides*) with usually six or seven lateral veins per side of midrib (vs. [three]four or five, less frequently six veins), the relatively small disc lobes, 1/10–1/4 length of sepals (vs. 1/5–2/5[1/2] length of sepals), mericarps with wings 5–7 mm high and fruit bodies usually strongly contrasting in color with wings (vs. wings [5]6.6–12 mm and fruit bodies only slightly to moderately contrasting with wings).

Additional specimens examined. MEXICO. **Colima:** 11 km W de Itlahuacán, camino a Agua de la Virgen, *Martínez S. et al. 4406* (MEXU, TEX). **Guerrero:** Montes de Oca, San Antonio, *Hinton & Hinton 14087* (GH, K, LL, NY, US); Distr. Adama, Temisco, lower barranca de la Guacamaya, *Mexía 8887* (B, F, GH, MO; Fig. 2M, NY, US); Acapulco, P. N. El Veladero, *Noriega A. 477* (MEXU); Chilpancingo, Rincón de La Via, *Kruse 114* (MEXU); Coahuayutla, Los Alacranes, *Calónico S. 18283* (MEXU); José Azueta, Cerro Bolonche, E del mirador del Parque Ecol. La Vainilla, *Gallardo H. et al. 213* (MEXU); Mochitlán, Rincón de La Via, *Kruse 19631128-134* (MEXU); Mochitlán, Rincón de La Via, *Kruse 5570* (B, M, MEXU, MO), *19630323-135* (M); San Luis Acatlán, Atotonilco, *Martínez S. et al. 3564* (MEXU). **Jalisco:** camino El Central en el cruce con el sendero El Tejó, dentro de la Est. Biol. Chamela, UNAM, *Dominguez-Mariani 1233* (MEXU); Arroyo Colorado, ca. 3 km O del camino Eje Central, dentro de la est. Biol. Chamela, *Dominguez-Mariani & Calónico S. 896* (MEXU); 2.5–4 mi. (N of) La Cuesta, rd. to Talpa de Allende, *McVaugh 21214* (MICH); Acatic. Quimixto, *Mexía 1186* (BM, MICH, MO, NY, US); Autlán, 5 mi. N of Bahía de Navidad, *McVaugh 20903* (MICH); Cabo Corrientes, valley of Río las Juntas, *McVaugh 25434* (MICH); La Huerta, Est. Biol. Chamela, *Pérez J. et al. 313* (MEXU), *Lott & Bullock 1436* (MEXU, MO, TEX); La Huerta, brecha y playas La Manzanilla–El Tamarindo, *Villarreal 7141* (MICH); La Huerta, Rancho Cuixmala, *Ayala 1232* (MEXU, MICH, MO); La Huerta, UNAM, 8 km E de Chamela, *McVaugh 25146* (MICH); Tolimán, camino de San Pedro Toxín a Toxín, *Ramírez D. 2939* (MEXU); Tuxcacuesco, E-central Sierra de Manantlán in pass betw. Cerro Grande y Cerro en Medio, *Cochrane et al. 12294* (MICH). **México:** Temascaltepec, Limones, *Hinton 6723* (BM, F, GH, K). **Michoacán:** W facing slopes of Sierra Madre del Sur, 32 km N of Playa Azul, *King & Soderstrom 4943* (MEXU, MICH, NY, TEX, US). **Nayarit:** Islas Marías, Isla María Magdalena, *Chiang C. & Flores F. 1069* (MEXU, MO); Compostela, a 10 km al W de Mazatán por el camino viejo a Las Varas, *Téllez V. & Chiang C. 9718* (MEXU, MO; Fig. 1H); Tepic, en el Km. 3–5 del camino al Ingenio La Escondida, *Téllez V. & Salinas T. 11919* (MEXU, MICH, MO); Tepic, on bajada ca. 19 mi. NW of Tepic, hwy. to Mazatlán, *McVaugh & Koelz 724* (MICH). **Oaxaca:** Putla, Puente de la Pastora, 2 km S of Cacahuatepec, *McVaugh 22221* (MICH).

15. Gouania velutina Reissek in Mart., Fl. Bras. 11(1): 105. 1861. TYPE: [Guyana]. "Guyana interiore," *R. H. Schomburgk 747* (holotype, W not seen, W holo. fragm. at F!, W photo F neg. 32603!; isotypes, BM-544412!, BM-796336!, GH!, K!). Figures 1I, 2N.

Gouania colurnifolia Reissek in Mart., Fl. Bras. 11(1): 107. 1861, as "*colurnaefolia*." TYPE: Brazil. Ceará: "Villa do Crato," Oct. 1838, *G. Gardner 1523* (holotype, W not seen; isotypes, BM-54408!, BM-544409!, F!, G not seen, G fragm. at F!, G photo F neg. 23292!, GH!, K!, NY-232902!, NY-232903!). [Locality taken from BM-54408, BM-544409, NY-232903.]

Liana; young branches solid or hollow in part, densely villous or velutinous, trichomes light red-brown or white-yellow. Leaf blades 4–10.5 × 3–8 cm, elliptic or widely elliptic, membranaceous to subcoriaceous, adaxial surface drying dark green-brown or dark green-black, densely to abundantly pubescent, glabrescent with age, with trichomes 0.2–1 mm, straight to slightly curved, ± appressed, ascending or spreading in all directions, white to light red-brown, abaxial surface drying pale green or pale yellow-green, densely pilose to tomentose with trichomes 0.2–1 mm, spreading and matted, white and light red-brown, lateral veins 5 to 7 per side of the midrib, diverging at 45°–60° angles, base cordate or subcordate, margin crenate or crenulate (rarely serrulate), 1 to 3 teeth/cm, tooth glands cupular or less frequently pulvinate, apex obtuse-apiculate or rounded-apiculate to short-acuminate, less frequently acute to acuminate; stipules 2-lobed (Fig. 1I), at least some retained into young fruit, upper lobe 4.25–11 × 1–4 mm, curving upward, lanceolate, acuminate, often with long extended and flexuous tip, lower lobe 3.5–10 × 4–11 mm, curving downward, margins recurved to stipule folded in half to cucullate, foliaceous, orbicular to reniform, often with extended tip or 2 long teeth; petioles 4–10(15) mm. Inflorescence with longest racemiform part 7–17 cm, rachis velutinous to villous with trichomes light red-brown or white-yellow, bract of cyme 2.5–3.5 mm, lanceolate, acuminate, cymes appearing sessile, mature flowers appearing sessile to pedicels to 0.75 mm, hypanthium densely velutinous with trichomes light red-brown or white-yellow; sepals 0.6–1 mm, externally densely villous, pilose or sericeous, trichomes light red-brown or white-yellow; petals 0.6–0.8 mm; stamens with filaments 0.4–0.75 mm, anthers 0.2–0.3 mm; disc excluding lobes 1–1.6 mm diam., glabrous or less frequently with few trichomes along annulus, disc lobes 0.4–0.6 mm, lanceolate, acuminate, not lobed, (1/2–)2/3–1× length of sepals; style pubescent at base. Young fruits densely velutinous, trichomes light red-brown or light yellow; mature mericarps butterfly-shaped (Fig. 2N) but with emargination at base only, the apex truncate or nearly truncate (less frequently rounded to obtuse), the wings attached to apex and base of fruit body as well as sides, externally drying dark brown or dark red-brown, darker over fruit body, densely velutinous on fruit body to densely pilose on wings with trichomes 0.25–1.2 mm, light red-brown or white-yellow, internally drying yellow-white to pale brown on wings contrasting noticeably but not markedly with grayish red-brown fruit body with red-brown rays extending into wings, fruit body 4–6 mm high, wings 6–9 mm high, distance between highest points of 2 wings 0–2 mm, width of mericarp 8–10(11) mm, 1.5–2(–2.5)× height of fruit body, width of fruit body (2)2.5–3(3.5) mm, 1/4–1/3 width of mericarp; seeds 2.25–2.5(3.3) × 1.6–2.25 mm, shiny brown.

Iconography. Krings and Braham (2005: 126, tab. 10.1, fig. A, as *Gouania eurycarpa*); Steyermark and Berry (2004: 476, fig. 402, excl. floral insert, as *G. polygama*); Reissek (1861: tab. 25, fig. 7; tab. 26, fig. 9a, 9b as *G. colurnifolia*). An excellent image of the stipules of *G. velutina* can be viewed at <http://www.tropicos.org/ImageFullView.aspx?imageid=100217678>.

Habitat and distribution. *Gouania velutina* is known from Mexico (Isthmus of Tehuántepec, Oaxaca), northwestern Costa Rica (Guanacaste and Garabito, Puntarenas), northern and central Panama (Chiriquí and Veraguas), northwestern Trinidad, and northern South America (northern Venezuela, Guyana, and northern Brazil). It is found in savannas and dry shrub lands, from elevations of 0 to 500 m in Central America and Mexico, from 0 to 70 m in Trinidad, and from 0 to 1000 (rarely to 1600) m in South America (Figs. 5A, 6A, 8A).

IUCN Red List category. Assessed as Data Deficient (DD) by IUCN (2012) criteria, I have seen 126 collections of *Gouania velutina* from scattered locations from Oaxaca, Mexico, to northern South America. The species has an estimated area of occupancy of at least 336 km^2. However, as this species is only known from vulnerable savannas and dry shrub lands, further study is strongly recommended to determine its conservation status.

Phenology. *Gouania velutina* has been collected in flower in Mexico in August and September, in Costa Rica and Panama in September and November, and in Trinidad in October and November.

Discussion. Specimens of *Gouania velutina* from Mexico, Central America, and Trinidad closely resemble the Brazilian type of *G. colurnifolia*. The type of *G. velutina* from Guyana differs from that of *G. colurnifolia* only in the presence of a few trichomes along the disc annulus. The Mexican and Central American specimens all have the annulus glabrous, but specimens from Trinidad (and South America) can have the annulus either glabrous or pubescent. Material from South America (excluding the types) differs from that in North America by frequently losing the stipules prior to anthesis, in the lower lobe of the stipule being sometimes somewhat smaller, and the coloration pattern of the internal surface of the mericarp more variable. The synonymy employed here was first published by Triana and Planchon (1872: 382).

The names *Gouania velutina* and *G. colurnifolia* have not previously been applied to Central American or Mexican specimens. Specimens of *G. velutina* have been misidentified as either *G. polygama* or *G. eurycarpa* and were treated in Krings and Braham (2005) as the latter. *Gouania polygama* is easily distinguished in fruit by its nearly glabrous, dumbbell-shaped mericarps versus velutinous, butterfly-shaped mericarps in *G. velutina*. In flower, *G. polygama* differs in its rarely retained, bilobed stipules, with both lobes lanceolate, the annulus always pubescent, and the disc lobes (1/3–)2/5–3/5 (–2/3) the length of the sepal lobes versus the bilobed stipules with the lower lobe orbicular to reniform with the margins recurved to the stipule lobe folded in half to cucullate, the usually glabrous annulus, and the disc lobes (1/2–)2/3–1× the sepal length in *G. velutina*. *Gouania eurycarpa* differs from *G. velutina* in both of the lobes of the bilobed stipules lanceolate, the disc lobes square or transversely rectangular, bilobed, and 1/4 to 1/3 the length of the sepals, and the mericarps emarginated to cleft at both apex and base, with the internal surface lacking red-brown rays in the wings. In *G. velutina*, the lower lobe of the stipule is orbicular to reniform with the margins recurved to the stipule lobe folded in half to cucullate, the disc lobes are lanceolate, unlobed, and longer relative to the sepals, and the mericarps emarginate only at the base with red-brown rays extending from fruit body into the wings.

Figure 402 in Steyermark and Berry (2004) is labeled as *Gouania polygama*, but depicts a specimen with pubescent mericarps of the shape and internal markings that better correspond to those of *G. velutina*. Large stipules are shown in the figure, but the actual shape and bilobed nature are not clear. The floral insert of Figure 402 in Steyermark and Berry (2004) represents neither the flower of *G. velutina* nor *G. polygama*. The illustrations cited from Reissek show only the leaves.

Additional specimens examined from Mexico, Central America, and the West Indies. COSTA RICA. **Guanacaste:** Gulf of Nicoya, Island of San Lucas, *Barclay 2758* (BM); Buissons a Nicoya, *Tonduz 13661* (BM, G, GH); halbwegs zwischen Matapalo und Salinas an der Pazifikküste, N Tamarindo, *Döbbeler 2328* (M); S Tamarindo, etwa 1.5 km SW Icacal, *Döbbeler 3828* (M); Tamarindo an der Pazifikküste, Hang kurz östlich oberhalb der "Cabinas Pozo Azul," *Döbbeler 4713* (M); P. N. Santa Rosa, *Barringer et al. 4030* (F, MO), *Liesner 4338* (MO; Fig. 2N), 3–4 km E of park headquarters, *Liesner 2381* (MO); La Cruz, P. N. Guanacaste, Volcán Orosí, Est. Pitilla, Sta. Cecilia 9 km S, *López 82* (K, MO; Fig. 1I); La Cruz, P. N. Santa Rosa, *Janzen 10120* (MO), cuenca del Papagayo, sect. Santa Elena, Tierra Blanca, *González & Espinoza 2622* (MO), cerca de la Est. Murciélago, *Quesada 40* (K, MO, NY), Quebrada de Costa, *Garwood et al. 503* (BM, MO); Liberia, P. N. Santa Rosa, Faja Costeña del Golfo de Papagayo, *Fernández & Hood 1276* (MO), 30 km NW of Liberia, *Janzen 12133* (MO), de Bahía Salinas a Santa Cecilia, Est. Santa Rosa, *Espinoza 972* (MO); Liberia, *Jiménez M. 1561* (NY), Hac. Pocosol, faldas del Volcán Orosí, *Jiménez L. s.n.* [16 dic. 1966] (F); Bagaces, *Quiros C. 856* (F), Comelco E, W of Bagaces, *Heithaus 370* (MO), Guayabo, *Berrocal & J. Sánchez 107* (MO), Comelco, 5 km NW of Bagaces, *Opler 1911* (F, MO); Comelco, near Bagaces, area A, *Opler 447* (F), P. N. Palo Verde, Cuenca del Tempisque, Ojo de Agua, Papayito, Balas de Cañon, *Acosta et al. 2573* (MO), P. N. Palo Verde, Valle del Tempisque, Est. Palo Verde, Cerro Jocote, *Chavarria 901* (F, MO); Cañas, *Daubenmire 559* (F), Finca La Pacífica, *Daubenmire 283* (F); Santa Cruz, R. V. S. bosque Diriá, Cuenca del Tempisque, Fila Vista del Mar, *González 1265* (MO), *Chavarría et al. 1798* (MO). **Puntarenas:** Garabito, Cuenca del Jesús María, *Rodríguez G. et al. 4141* (MO, NY), *Rodríguez G. et al. 1384* (MO), Valle del Tárcoles, Punta Loros y alrededores, *Hammel et al. 18851* (MO). MEXICO. **Oaxaca:** 9 mi. W Zanatepe, *Vaughan et al. 750* (MO); Juchitán, 7 km al W de Almoloya, hacia la Torre de Microondas, Palma Sola, Mpio. del Barrio, *Torres C. & Cabrera C. 6195* (MEXU). PANAMA. **Chiriquí:** Chorcha, *Gutiérrez de S. 33* (MO). **Veraguas:** Santiago, Cerro Forestal, *Rodríguez 46* (F, MO), ca. 5 mi. N Santiago, vic. Santa María river, *Blum & Tyson 613* (MO).

TRINIDAD. s. loc., *Fendler 281* (BM, K), *Othmer s.n.* [4 Nov. 1903] (M), *Lockhart s.n.* [s.d.] (G); Guanapo, *von Eggers 930* (G, M, PR, TEX); ad Caroni, *von Eggers 1378* (US); Biscayne Bay area of Monos Island, *Howard 10402* (A); S Augustine Circular Rd., *Richardson 998* (NY); St. Ann's, *Broadway 5071* (A, BM, F, G, MO); Valley, Hort. Trin., *Broadway 4426* (MICH).

Selected specimens examined from South America. BRAZIL. **Pará:** Forte São Joaquim, Rio Jacutú, *von Luetzelburg 20581* (M). **Paraíba:** Maturéia, Pico do Jabre, *Agra et al. 4019* (MO). **Pernambuco:** s. loc., *Pickel 554* (B); Floresta, Inajá, Res. Biol. Serra Negra, *Rodal & Tamashiro 617* (K). **Roraima:** SEMA Ecol. Stat., Ilha de Maracá, *Ratter et al. 5499* (NY). GUYANA. **East Berbice:** Berbice–Corentyne region, Baba Grant Sawmill, Corentyne River

above Cow Falls, *McDowell & D. Gopaul 2426* (B, NY, TEX, US). **Essequibo:** U. Takutu–U. Essequibo Region, along tributary of Takutu River, *Gillespie & Gopaul 2000* (TEX, US), S Rupununi savanna, *Gillespie et al. 1623* (TEX, US). **Rupununi:** Sand Creek, "Rupununi R.", *Wilson-Browne 101* (K, NY); St. Ignatius, Lethem Rd., Moka-Moka Creek, *Harrison 1330* (K, NY). VENEZUELA. **Anzoátegui:** Libertad, rd. from El Vigia to Buenos Aires, *Davidse & González 19475* (MO, NY). **Bolívar:** Nun. Sifontes, Tumeremo, via Fuerte Tarabay, *Knab-Vispo 1248* (NY); Piar, la Camilera, 40 km O de El Manteco, *Delascio C. & Liesner 7001* (MO, NY); cercanias al Palmar, Minas de Manganeso-Dolomita, *Colella 1552* (NY, TEX); 1 km N of Paragua, *Liesner & González 5764* (MO). **Carabobo:** Maturín, near Las Trincheras, *Alston 5625* (NY); Valencia, *Pittier 9020* (NY). **Guarico:** Est. Biol. de los Llanos, Calabozo, *Ramírez 649* (MO); Río Orituco, *Ramírez 624* (MO); ca. 39 km SSW of Calabozo on Hato Masaguaral, *Rondeau 508* (MO). **Mérida:** Guayana, *Schwabe s.n.* [Aug. 1959] (B). **Portuguesa:** Guanare, UNELLEZ, *Stergios & Aymard 6444* (MO). **Táchira:** Capacho, arriba de Peribeca, hacia El Topón, *Bono 5147* (MO). **Zulia:** Bolívar, carr. El Consejo–Quiroz–El Pensado–Las Mercedes, entre El Pensado y Las Mercedes, *Bunting 5710* (MO); Colón, carr. Casigua–Palmira–Encontrados, *Bunting & Fucci 9815* (NY).

Rejected Name

Gouania paniculata Spreng., Neue Entdeck. Pflanzenk. 3: 49. 1822. TYPE: Hispaniola. "S. Dom.," s.d., *C. L. G. Bertero s.n.* (lectotype, designated here G-DC [G00206175] not seen, G-DC digital image!).

Sprengel (1822) published this name without citing a collector but including the locality of the collection as Hispaniola. A number of the characters described are at odds with *Gouania*, such as the tendrils lacking, the ciliate bracts, and the corolla absent. De Candolle (1825) included this species as *Gouania ? paniculata* and cited a collection in his herbarium, *C. L. G. Bertero s.n.* from Sancto Domingo. I have examined a digital image of this collection (G00206175) and believe it to be an isotype of *G. paniculata*. The *Bertero* collection at G-DC (G00206175) matches the Sprengel (1822) description, and we know that at the time of publication (1822), Sprengel had material of Bertero from Hispaniola because he cites for the first species in this same paper (*Calymperes berterii* Spreng.) a *Bertero* collection from Hispaniola. The G-DC specimen has two labels, but neither appears to be in Sprengel's hand, suggesting that this is probably not the holotype, which was most likely in the Müller-Sprengel herbarium that was purchased by B and is no longer extant. I identify *Bertero s.n.* (G-DC [G00206175]) from the digital image as *Alchornea latifolia* Sw. (Euphorbiaceae) and select it as the lectotype of *G. paniculata*.

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Appendix 1. Index to Exsiccatae. Collections are alphabetical by collector name. The number in parentheses corresponds to the species number in the List of Species. All type collections (including syntypes, isosyntypes, lectotypes, isolectotypes, neotypes, and epitypes) appear in boldface. All collections cited here were examined by the author. Species listed are those found in North America (from Florida and Mexico to Panama and the islands of the Caribbean); the specimens include members of those species found in South America.

List of Species

1. *Gouania colombiana* Suess.
2. *Gouania conzattii* Greenm.
3. *Gouania croatii* A. Pool
4. *Gouania ekmanii* Alain
5. *Gouania eurycarpa* Standl.
6. *Gouania ferruginea* A. Pool
7. *Gouania guiengolensis* A. Pool
8. *Gouania hypoglauca* Standl.
9. *Gouania lupuloides* (L.) Urb.
10. *Gouania obamana* A. Pool
11. *Gouania polygama* (Jacq.) Urb.
12. *Gouania pubidisca* A. Pool
13. *Gouania rosei* Wiggins
14. *Gouania stipularis* DC.
15. *Gouania velutina* Reissek

Abbott, W. 2759 (11), *2823* (9); *Acevedo, D. 92* (8); *Acevedo-Rodríguez, P. 7011* (9); *Acevedo-Rodríguez, P. & A. Reilly 2295* (9); *Acevedo-Rodríguez, P. & A. Siaca 3812* (9), *7087* (9); *Acevedo-Rodríguez, P. et al. 3363* (11), *7139* (11); *Acosta, L. 247* (9), *2149* (1); *Acosta, L. et al. 2573* (15); *Acosta Pérez, R. & G. Castillo C. 962* (9); *Adams, C. 5673* (9), *8156* (9); *Agra, M. F. et al. 4019* (15); *Aguilar, R. 585* (8), *2756* (11), *3276* (8), *3755* (11), *4843* (9), *5735* (1), *8329* (11), *8444* (11); *Aguilar, R. et al. 116* (8); *Aguilar G., J. I. 219* (9), *1127* (9); *Aguilar H., M. 125* (9), *345* (9); *Aguilar M., G. & J. Aguilar M. 4936* (9), *4942* (9); *Aguilar M., G. & S. Aguilar 1304* (9); *Aguilar M., G. & A. Cortés C. 4513* (11), *4534* (9); *Aguilar M., G. & G. López A. 8556* (11), *8674* (11), *8701* (9), *8708* (11), *8771* (11), *9194* (9), *9249* (11); *Aguilar M., G. et al. 4599* (11), *4662* (9), *4912* (9), *5208* (11), *5353* (9), *8147* (11), *8811* (11), *8952* (11); *Aguilar Zepeda, J. 388* (9); *Alavez Solano, D. s.n.* [s.d.] (11); *Alcorn, J. 1941* (9), *2002* (11), *2217* (11); *Alfaro, E. 1838* (9), *2478* (9); *Allard, H. 13199* (11), *13200* (9), *13222* (11), *13413* (9), *13458* (11), *14470* (11), *16617* (11), *18078* (11); *Allen, P. H. 103* (11), *1078* (11), *2863* (11), *4108* (11), *4290* (11), *5441* (11); *Alston, A. H. G. 5625* (15); *Alvarado-Cárdenas, L. O. & A. Reyes-García 745* (12); *Alvarado-Cárdenas, L. O. et al. 466* (11); *Alvarado Flores, F. 97* (9); *Álvarez M., D. 388* (5), *455* (5), *629* (5), *7749* (5); *Álvarez M., D. & J. P. Abascal 2838* (5), *3006* (11); *Álvarez M., D. & I. Jiménez 7702* (5); *Álvarez M., D. & C. Jimenez J. 3033* (5), *3278* (5), *3602* (5); *Álvarez M., D. et al. 6822* (11), *7063* (11); *Ames, O. s.n.* [11 Nov. 1902] (11); *Ancuash Atsut, E. 327* (11), *1229* (11), *1501* (11); *Anderson, A. s.n.* [s.d.] (9); *Anderson, W. & C. W. Laskowski 3688* (9); *Andrade S., A. 86* (13); *Angulo, L. 571* (11); *Ankli, A. AANK376* (9); *Aquino, A. 202AA* (9), *207AA* (12), *211AA* (9); *Araquistain, M. 412* (11), *3140* (8), *3169* (8); *Araquistain, M. & D. Castro C. 1835* (11); *Araquistain, M. & P. P. Moreno 991* (11); *Araya, F. 52* (8); *Araya, F. & J. F. Corrales 795* (8); *Aristeguieta, L. 5138* (15); *Arnason, J. & J. Lambert 17886* (11), *17918* (5); *Arroyo Padilla, L. 1351* (11); *Arvigo, R. & P. Cocom 696* (11), *703* (5), *716* (11); *Arvigo, R. et al. 72* (9), *733* (9); *Atha, D. & T. A. Zanoni 752* (11), *877* (9); *Avendaño R., S. 679a* (9); *Ayala, M. G. 204* (13), *1121* (13), *1232* (14); *Ayala Flores, F. 2903* (11); *Aymard, G. 4285* (11); *Aymard, G. et al. 2340* (15), *10158* (11); *Azofeifa, A. 671* (11).

Bacab W., G. 150 (5); *Bailey, L. 257* (11); ***Baker, C. F. 152 (673)*** (12), *1885* (11); *Baker, C. F. & M. Arbarca y Vascquez 3895* (11); *Baker, M. A. 6836* (1); *Baker, R. 14246* (11); *Balam, F. 627* (5); *Baldwin, A. 52* (9); *Balick, M. J. et al. 2121* (5); *3016* (11), *3197* (11), *3612* (10); *Bang, M. 1187* (11), *1270* (11); *Barclay, G. W. 1011* (11), *2665* (12), *2758* (15); *Barco Rodríguez, M. MABR-170* (9); *Barkley, F. & E. D. Barkley 39672* (11); *Barkley, F. & G. Gutiérrez V. 1797* (11); *Barquero M., H. s.n.* [Aug. 1969] (8); *Barreto, H. 7090* (11); *Barringer, K. et al. 4030* (15), *4059* (8); *Bartholomew, B. M. et al. 2606* (9), *3499* (9); *Bartlett, H. H. 11433* (9), *11564* (9), *11951* (9); *Bates, W. s.n.* [s.d.] (9); *Beaman, J. 5217* (9); *Beard, P. 1328* (11); *Beetle, A. 2120* (11); *Bélanger, C. 316* (9), *624* (9); *Bello C., E. & E. Cruz L. 5392* (11); *Belshaw, C. M. 3198* (11); *Benitez-Paredes, A. 3890* (9); *Bensman, R. 298* (1); *Berlandier, J. 2204* (9); *Berlin, B. 794* (1), *861* (1); *Bernardi, L. 2587* (11); *Bernoulli, K. G. 1180* (11); *Bernoulli, K. G. & O. R. Cario 2048* (11); *Berrocal, J. & J. Sánchez 107* (15); ***Bertero, C. L. G.*** *s.n.* [1816–1821] (9), ***s.n.*** [s.d.] (11); *Billiet, F. & B. Jadin 6823* (11); *Biolley, P. 7107* (9); *Blackmore, S. & G. L. A. Heath 1709* (11), *1803* (9); *Blanchet, J. 3054* (11), *3104* (15); *Blandón, L. 105* (9); *Blodgett, F. H. s.n.* [s.d.] (9); *Blum, K. E. 2041* (11); *Blum, K. E. & J. D. Dwyer 2116* (11); *Blum, K. E. & E. L. Tyson 613* (15); *Boege, L. 627* (13); *Boldingh, I. 2811* (9); *Bono, J. 4634* (11), *4972* (15), *5147* (15); *Boom, B. M. 10030* (9); *Botello, D. 22* (11); *Bourdy, G. 1547* (11); *Bourgeau, E. 1464* (11), *1743* (9), *1745* (9); *Box, H. E. 1228* (9), *1856* (9); *Brace, L. 157* (9), *386* (9), *387* (9); *Brandegee, T. S. s.n.* [10 Oct. 1904] (13); *Bravo Hollis, H. 352* (9), *1310* (11); *Breckon, G. J. et al. 1094* (13), *1202* (11); *Breedlove, D. E. 7636* (11), *18978* (11), *19832* (9), *20302* (9), *23063* (9), *28108* (11), *28466* (9), *28594* (12), *29054* (9), *29146* (9), *29310* (11), *36724* (12), *37198* (11), *37404* (9), *48634* (11), *49118* (11), *53632* (9), *53648* (9); *Breedlove, D. E. & D. I. Axelrod 43216* (13); *Breedlove, D. E. & G. Davidse 54431* (9); *Breedlove, D. E. & P. H. Raven 13541* (9); *Breedlove, D. E. & R. F. Thorne 20726* (11), *21055* (11); *Brenes, A. s.n.* [6 Nov. 1932] (11), *6414* (11), *11827* (11); *Breteler, F. J. 4408* (11); *Bretting, P. K. J-82* (9), *J-87* (9); *Brewer, S. 5133* (11); *Briceño, E. & J. Rosales 158* (15); *Britton, E. G. 12* (11), *6537* (9), *Britton, N. L. 361* (9), *636* (9), *7170* (9), *15261* (9); *Britton, N. L. & E. G. Britton 8852* (9); *Britton, N. L. & J. A. Shafer 327* (9); *Britton, N. L. & P. Wilson 356* (11); *Britton, N. L. et al. 103* (11), *106* (11), *170* (9), *1147* (11); *Broadway, W. E. s.n.* [Dec. 1904] (9), *1200* (11), *3418* (11), *3995* (11), *4410* (11), *4426* (15), *5071* (15), *9115* (11); *Brokaw, N. V. L. & M. Schulze 122* (5), *194* (5); *Brumbach, W. 9528* (9), *9537* (9); *Buch, W. 1232* (9); *Bullock, S. H. 1198* (13), *1233* (13), *1382* (13); *Bunting, G. S. 5710* (15), *6724* (11); *Bunting, G. S. & L. Alfonso G. 8034* (15); *Bunting, G. S. & M. Fucci 8421* (15), *8423* (15), *9815* (15), *9817* (15); *Bunting, G. S. & L. Licht 600* (11), *1068* (11); *Bunting, G. S. & A. Stoddart 8994* (11); *Bunting, G. S. et al. 12267* (11); *Burch, D. et al. 1395* (11); *Burchell, W. 8756* (15); *Burger, W. C. & R. L. Liesner 6666* (11), *6918* (11);

Burger, W. C. & G. Mata U. 4629 (9); *Burnham, R. 41* (11), *1391* (1); *Burnham, R. & A. Krings 1571* (1); *Busey, P. 355* (11), *484* (11); *Bye, R. A. 2902* (9), *3209* (9), *3238* (9), *5681* (9), *5950* (9), *8845* (9); *Bye, R. A. et al. 18021* (9).

Caballero, R. 50 (11); *Cabrera C., E. F. 15276* (9), *16991* (5); *Cabrera C., E. F. & H. de Cabrera 2284* (9), *3692* (11), *3969* (5), *6209* (11), *6262* (5), *7387* (7), *7808* (5), *9297* (9), *9401* (9), *9460* (9), *9511* (9), *9571* (9), *9580* (9), *9716* (9), *9870* (5), *10135* (9), *10583* (5), *12318* (11), *12556* (5), *12983* (5), *15195* (9); *Cabrera C., E. F. & L. Cortés A. 73* (5), *101* (5), *195* (5), *237* (5), *260* (9), *352* (5); *Cabrera C., E. F. & G. Durán 433* (5), *610* (5), *666* (5); *Cabrera C., E. F. & M. J. Huft 7463* (9); *Cabrera C., E. F. & G. Ibarra Manríquez 1187* (5), *1443* (5); *Cabrera C., E. F. & R. Torres C. 915* (5), *1030* (5), *1070* (5); *Cabrera C., E. F. & S. Zárate P. 1552* (5); *Cabrera C., E. F. et al. 7733* (9), *7758* (11), *9762* (5); *Calderón, S. 150* (11), *150a* (9), *1256* (9), *1548* (9); *Calderón Vásquez, R. s.n. ISF00724* (9); *Callejas, R. et al. 4555* (1); *Calónico S., J. 4741* (13), *17920* (9), *18283* (14); *Calónico S., J. et al. 4228* (13), *5838* (13), *21341* (11), *21428* (9), *22225* (11), *24979* (11); *Calzada, J. I. 104* (10), *948* (9), *1684* (9), *2899* (11), *8347* (11), *14202* (11), *14518* (9); *Calzada, J. I. & J. Arellano 2241* (9); *Calzada, J. I. & I. Espejel 6675* (9); *Calzada, J. I. et al. 3970* (9), *6430* (9), *6664* (9); *Cámbar, I. 84* (9); *Campbell, E. J. F. 76* (10); *Campos, J. 6156* (11); *Campos, J. & M. Vásquez T. 2546* (11); *Campos V., A. 3345* (9), *5236* (10); *Campos V., A. et al. 62* (11); *Canela Lazaro, M. s.n.* [8 Oct. 1938] (9); *Cantrall, I. J. 2* (5); *Cárdenas, D. 1174* (3), *2054* (3); *Cárdenas C., C. 93* (11); *Carleton, M. 442* (10); *Carlson, M. s.n.* [1946] (9); *Carnevali, G. 4980* (5); *Carnevali, G. & F. May-Pat 5933* (9); *Carnevali, G. et al. 4303* (9), *6462* (9); *Carrasquilla, L. & R. Mendoza 1163* (11); *Carrasquillo, J. A. 117* (9); *Carrillo-Reyes, P. 5546* (2); *Carruthers, W. et al. s.n.* [Nov. 1884] (9); *Carter, A. M. & F. Chisaki 3468* (13), *3590* (13); *Carter, R. & R. G. García 5318* (9); *Carvajal, E. 81* (9); *Carvajal V., A. 283* (11), *322* (11), *406* (11); *Cascante, A. 546* (8), *782* (9), *1245* (11); *Cascante, A. & M. A. Blanco 967* (11); *Castillo, S. s.n. ISF00434* (9), *s.n. ISF00717* (9), *s.n. ISF00731* (9); *Castillo Mont, J. J. & J. A. Castillo Mont 1639* (11); *Castillo Mont, J. J. & M. Véliz Pérez 2775* (6); *Castrejón R., J. F. et al. 698* (9), *976* (13); *Castro C., D. 2311* (9), *2352* (9), *2411* (11); *Catalán H., C. 184* (9); *Catalán H., C. & F. Terán C. 853* (9); *Catesby, M. et al. s.n.* [1726] (9); *Cedillo T., R. 2624* (10), *2913* (9), *3450* (11), *3467* (11), *3528* (11); *Cedillo T., R. & J. I. Calzada 176* (10); *Cedillo T., R. & R. Torres C. 1036* (9); *Centeno, C. 190* (11), *211* (11); *Chacón G., A. 718* (11); *Chacón G., I. A. 440* (11), *964* (8); *Chan V., C. 4245* (9), *4477* (5), *4573* (5), *6094* (5); *Chapman, A. s.n.* [s.d.] (9); *Charlton, D. et al. 2818* (13); *Chavarría, U. 324* (11), *867* (11), *901* (15), *1790* (9); *Chavarría, U. et al. 1798* (15); *Chavelas Pólito, J. ES-4273A* (11); *Chavelas Pólito, J. & A. Pérez J. 312* (11); *Chavelas Pólito, J. et al. 2097* (11); *Chaves, J. L. 539* (8); *Chávez, L. s.n.* [6 Oct. 1997] (9); *Chiang C., F. 188* (9), *230* (9), *485* (11); *Chiang C., F. & G. Flores F. 1069* (14); *Chinchilla P., F. s.n. ISB00664* (9), *s.n. ISB00696* (12); *Cicero, J. 8310* (9); *Cid Ferreira, C. 4706* (15); *Clarke, O. et al. 1589-12* (9); *Claussen, P. s.n.* [s.d.] (11); *Clement, (Brother) 224* (11), *3136* (11), *7445* (9); *Clement, E. et al. TB93/177* (11); *Clewell, A. F. & G. Cruz 4106* (11); *Cochrane, T. S. et al. 12294* (14); *Colella, M. 1049* (15), *1552* (15); *Combs, R. s.n.* [s.d.] (11), *93* (11); *Comision de Dioscorea P192* (11); *Contreras, E. 300* (5), *368* (5), *1581* (5), *3115* (11), *3459* (11), *3675* (11), *5571* (5), *5591* (11), *6456* (11), *7433* (11), *7547* (9), *9313* (11), *9450* (10), *9498* (10), *11148* (10); ***Conzatti, C.*** *s.n.* [9 June 1907] (2), *827* (11), ***1567*** (2), *1829* (2), *1935* (2), *4402* (12), *4407* (12), *4902* (2); *Cook, M. et al. 93* (11); *Cooper, G. 162* (11); *Cordero, G. 113* (11); *Coronado G., I. & J. Reyes 6462* (12), *6510* (11); *Coronado G., I. & R. M. Rueda 3516* (9); *Coronado G., I. et al. 470* (11), *1546* (11), *3094* (11); *Correa A., M. D. 498* (11); *Correa A., M. D. & R. L. Dressler 986* (8); *Correa A., M. D. et al. 3443* (11), *3816* (11), *8339* (11); *Correll, D. S. 42156* (9), *44193* (9), *50213* (9), *51129* (9); *Correll, D. S. & H. B. Correll 47621* (9); *Correll, D. S. et al. 40277* (9), *51075* (9); *Cortés A., L. 57* (11); *Cortés A., L. & R. Torres C. 104* (9), *1040* (11); *Cortés A., L. et al. 212* (11), *267* (9), *490* (9), *640* (9), *771* (9); *Cowan, C. 2025* (9), *2594* (11), *2799* (9); *Cowan, C. et al. 2549* (11); *Cowell, J. F. 79* (11); *Crane, C. 581* (5); *Croat, T. B. 4622* (11), *4709* (11), *4825* (11), *5744* (11), *7075* (11), *7105* (11), *7154* (11), *7235* (11), *7274* (3), *7723a* (11), *7769* (11), *7984* (3), *8584* (11), *8668* (11), *10852* (11), *12651* (11), *12682A* (11), *12699* (3), *12739* (3), *12894A* (11), *13005* (11), *13120* (11), *13482* (3), *13673* (9), *15020* (11), *17946* (11), *21902* (11), *26764* (9), *35776a* (8), *41935* (9), *42152* (9), *45467* (2), *58834* (1), *67750* (9), *69869* (11), *78530* (9); *Croat, T. B. & D. P. Hannon 63191* (11), *64065* (11), *64498* (9), *64650* (9); *Croat, T. B. & P. Díaz Jiménez 100142* (11), *100318* (9); *Croat, T. B. & M. Sizemore 81631* (11); *Croizat, L. 1017* (11); *Crutchfield, J. & M. C. Johnston 5701* (9); *Cuadros, H. 3285* (11); *Cubas, H. 59* (9); *Cuevas G., R. & N. Nuñez 3987* (9); *Curran, H. M. s.n.* [4 Dec. 1952] (11), *s.n.* [28 Dec. 1952] (11), *37* (15), *198* (15); *Curtiss, A. 38* (9), *272* (11), *474* (9); *Czerwenka, J. & S. Peláez F. 415* (9).

Dale, S. et al. s.n. [1716] (9); *D'Arcy, W. G. 285* (9), *9597* (11), *9835* (9), *10608* (11), *10634* (8); *D'Arcy, W. G. & G. McPherson 16091* (11); *Darwin, S. P. 2272* (9); *Darwin, S. P. & D. A. White 2229* (5); *Darwin, S. P. et al. 2170* (9); *Daubenmire, R. 283* (15), *447* (11), *559* (15); *Davidse, G. 24099* (9); *Davidse, G. & A. Brant 32625* (11); *Davidse, G. & A. C. González 19228* (11), *19392* (11), *19475* (15), *20962* (11); *Davidse, G. et al. 11445* (11), *28521* (9); *Davidson, C. 3326* (9); *Davidson, C. & G. Martinelli 10637* (15); *de Nevers, G. C. 4094* (1), *5803* (8); *de Nevers, G. C. & H. Herrera 4269* (1), *5655* (11); *de Nevers, G. C. & C. Todzia 3543* (1); *de Nevers, G. C. et al. 4748* (11), *4895* (11), *6886* (11); *Deam, C. C. 49* (9), *68* (10), *110* (9); *Degener, O. 18968* (9); *Degener, O. & I. Degener 26765* (9); *Delascio C., F. & R. L. Liesner 7001* (15); *Delascio C., F. et al. 9967* (15); *Delgado N., G. 161* (11); *Díaz, J. 2* (11); *Díaz L., C. L. 3620* (2); *Díaz Santibáñez, C. et al. 8163* (1); *Dillon, M. O. et al. 1845* (10); *Dixon, T. 176* (11); *Döbbeler, P. 1392* (11), *2328* (15), *3217* (11), *3779* (9), *3828* (15), *4713* (15), *5349* (11), *6238* (9); *Döbbeler, P. & R. Menjívar 2031* (11); *Döbbeler, P. & J. Poelt 3283* (11); *Dod, D. & T. A. Zanoni 10099* (11); *Dodson, C. et al. 7153* (11); *Dominguez, R. 144* (13); *Dominguez-Mariani, A. 1233* (14); *Dominguez-Mariani, A. & J. Calónico S. 896* (14), *946* (13); *Donnell Smith, J. 4763* (11); *Dorantes L., J. et al. 2543* (10), *3639* (11), *3991* (10), *5083* (9); *Drouet, F. & D. Richards 3936* (13), *3977* (13); *Dubs, B. 2158* (11); *Duckett, F. & H. T. O'Neill s.n.* [17 June 1930] (9); *Duke, J. 7191* (9), *7192* (9), *9274* (11), *9543* (11), *10185* (11), *10316* (11), *Durán, R. 1838* (9); *10353* (11), *10383* (11), *10550* (11); *Dunlap, V. C. 235* (8); *Durán, R. 1838* (9); *Durán, R. & C. Chan V. 1453* (9); *Durán, R. et al. 1114* (5); *Durán-Espinosa, C. M. et al. 9* (11), *147* (11); *Durán F., A. & S. Levy T. 442* (11); *Duss, A. 650* (9), *2979* (9); *Dwyer, J. D. 67* (11), *4860* (11), *8381* (11); *Dwyer, J. D. & M. V. Hayden 7572* (9); *Dwyer, J. D. & A. G. Robyns 124* (11); *Dwyer, J. D. et al. 106* (11), *464* (11).

Earle, F. 606 (11); *Ebinger, J. E. 961* (8); *Eggers, H. F. A. von s.n.* [Sep. 1880] (9), *s.n.* [Nov. 1880] (9), *s.n.* [Aug. 1881] (9), *s.n.* [June 1883] (9), *11* (9), *58* (9), *80* (9), *85* (9), *145* (9), *175* (9), *930* (15), *1378* (15), *5354* (11), *6312* (9), *6832* (9), *7127* (9); *Ehrenberg, C. s.n.* [s.d.] (9), *725* (11); ***Ekman, E. L.*** *2735* (11), *3252 (P.I.T.R. III)* (9), *3313* (11), *6577* (9),

H7130 (9), *H7236* (9), *H7269* (11), *H7284* (9), *7915 (PIR III)* (11), *H9154* (9), *H16101* (11), *H16102* (9), *16675* (4), ***17985*** (4), *17985* (4); *Elorsa C., M. 642* (7), *684* (13), *726* (13), *751* (13), *785* (13), *891* (13), *991* (13), *1037* (13), *1922* (11), *2398* (13); *Enríquez, O. 6787* (11); *Erlanson, C. 18* (11); *Ervendberg, C. 279* (9); *Escalante, S. 245* (5); *Espinal, M. 180* (9); *Espinal O., F. 120* (9); *Espinosa Jiménez, J. 473* (11); *Espinosa Jiménez, J. et al. 1022* (9); *Espinoza, R. 627* (11), *696* (11), *801* (8), *972* (15); *Evangelista, V. 81* (11).

Fairchild, D. 2559 (9); *Faris, J. 550* (9), *601* (9), *602* (11); *Feddema, C. 331* (2), *488* (9), *764* (9), *1217* (13), *2619* (9), *2697* (9); *Felger, R. 84–93* (13); *Fendler, A. 108* (11), *281* (15), *9525* (11); *Fernández, Á. & C. Hood 1276* (15); *Fernández, D. et al. 107* (9); *Fernández, R. 2229* (11), *2351* (10); *Fernández, R. & C. Guadarrama-Zamudio 1381* (11); *Ferris, R. S. 5552* (9), *6052* (13); *Ferris, R. S. & Y. Mexía 5157* (13); *Fishlock, W. 243* (9); *Fletes, E. 446* (11); *Flores, A. et al. 3024* (13); *Flores, R. s.n.* [Dec. 1933] (9), *s.n.* [Dec. 1935] (9); *Flores F., G. & R. Ramírez R. 2675* (13); *Flores F., G. & P. Tenorio L. 1203* (13), *1270* (9); *Flores F., G. et al. 2941* (13), *4280* (9), *1102* (13); *Folsom, J. P. 9142* (11); *Fosberg, F. 54030* (9), *54144* (9), *56073* (11), *59240* (9); *Foster, R. s.n.* [Sep. 1969] (1), *811* (11), *1475* (11), *1487* (11), *1682* (11); *Freeland, J. & L. A. Spetzman 29* (9); ***Friedrichsthal, E. R. 646*** (11), *s.n. (W-1765)* (9); *Fryxell, P. A. 3683* (9); *Fuentes, Z. 597* (11); *Fuertes, L. 610* (9), *1332* (9).

Galeotti, H. 4311 (13); *Gallardo H., C. et al. 213* (14), *1525* (7); *Gallo, C. le 2150* (9); *Gama López, S. 336* (13); *Gamboa R., B. 1889* (9); *Garber, P. 94* (11), *150* (11); *García, M. 2429* (9), *García, R. 229* (11), *762* (9), *6080* (11), *6598* (11); *García, R. et al. 5657* (11); *García-Mendoza, A. et al. 3006* (11); ***Gardner, G. 1523*** (15), *1523-B* (15), *3640* (15), *4110* (15); *Garnier, A. 1305* (9), *4089* (11); *Garwood, N. 1842A* (11); *Garwood, N. & P. Acuña 1758-a* (11); *Garwood, N. et al. 503* (15), *678* (11); *Gaumer, G. s.n.* [1899] (9), *658a* (9), *950* (9), *959* (9), *2082* (9), *2099* (9), *24285* (9), *24291* (9), *24413* (9); *Gentle, P. H. 236* (5), *1081* (5), *1444* (11), *1824* (11), *1846* (9), *1921* (10), *2304* (9), *3185* (10), *3226* (10), *4376* (10), *5121* (10), *7549* (11), *8543* (10), *8641* (10), *9049* (9), *9298* (10); *Gentry, A. H. 1864* (8), *2047* (1), *2650* (3), *3271* (1), *5572* (1), *5795* (1), *6662* (11), *9228* (11), *41203* (11); *Gentry, A. H. & H. Cuadros V. 68241* (11); *Gentry, A. H. & M. Horna 29372* (11); *Gentry, A. H. & E. J. Lott 32542* (10); *Gentry, A. H. & S. A. Mori 13525* (11), *13529* (11); *Gentry, A. H. & R. Tredwell 37271* (11); *Gentry, A. H. & E. L. Tyson 4830* (11); *Gentry, A. H. & E. M. Zardini 48869* (9); *Gentry, A. H. et al. 10710* (15), *11137* (11), *42963* (1); *60043* (1), *64278* (1), *71355* (11); *Gentry, H. S. 2378* (13), *4758* (13), *4949* (9), *14326* (13), *14493* (13); *Ghiesbreght, A. 131* (9); *Gillespie, L. J. & D. Gopaul 2000* (15); *Gillespie, L. J. et al. 1623* (15); *Gillis, W. 7311* (9), *8860* (9), *11911* (9); *Godfrey, R. 66226* (11); *Godoi, J. & D. F. Pereira 169* (11); *Goldman, D. 1918* (9); *Goldman, E. A. 218* (9); *Goll, G. 567* (9), *582* (9); *Goll, G. et al. 230* (9), *386* (9); *Gómez, A. et al. 380* (11); *Gómez, E. 1532* (9); *Gómez, I. 18* (9); *Gómez, R. 796* (6); *Gómez C., B. & G. Goméz F. 261* (11); *Gómez P., L. 19641* (11); *Gómez P., L. et al. 23128* (11); *Gonzales, A. 274* (11); *González, M. 1513* (11); *González, I. 48* (9); *González, J. 367* (11); *González, J. A. 1265* (15); *González, J. A. & R. Espinoza 2622* (15); *González, J. A. & G. Perera 998* (11); *González, J. A. & J. Serrano 458* (11); *González, J. A. et al. 1593* (11), *1640* (1); *González, J. C. & R. Villacorta M. 29* (9); *González, L. & A. Garita 2781* (11); *González, M. 1624* (11); *González M., F. 3209* (9); *González M., F. et al. 1460* (2); *González Ortega, J. 14* (13), *874* (13), *924* (13), *3139* (13), *4488* (13), *4674* (13), *4731* (13), *6113* (9); *González Quintero, L. 1819* (11); *Gooding, E. 333* (9); *Gordon, B. 63* (11); *Görts-van Rijn, A. et al. 221* (15); *Graham, J. & J. Schunke V. 439* (11); *Graham, S. 313* (11); *Grayum, M. et al. 4141* (11); *Greenman, J. M. & M. T. Greenman 5021* (11); *Greuter, W. 25547* (11); *Greuter, W. & R. Rankin Rodríguez 24839* (11), *24875* (9); *Greuter, W. et al. 25367* (11); *Grijalva P., A. 2042* (11); *Grijalva P., A. & M. V. de Grijalva 1486* (11); *Grijalva P., A. et al. 2146* (11), *3228* (11), *3282* (9); *Guadamuz, C. 2521* (11); *Guadarrama O., M. de la et al. 6106* (10); *Gudiño, E. 153* (1), *172* (1), *224* (1); *Guerrero, O. 444* (9); *Guido, F. 887* (11); *Guilding, L. s.n.* [s.d.] (9); *Guillén Villarroel, R. et al. 4225* (11); *Guízar Nolazco, E. 3276* (13); *Gutiérrez, E. 326* (5); *Gutiérrez Báez, C. 1596* (9), *2066* (9), *3790* (11), *5003* (9), *5019* (9), *5455* (9), *5969* (9); *Gutiérrez de S., M. M. 33* (15); *Guzmán, M. & D. Castro C. 2062* (11); *Guzmán, M. et al. 1165* (9), *1275* (9); *Guzmán, R. 769* (11).

Haber, W. 11382 (11); *Haber, W. & E. Bello C. 3532* (9), *6115* (11), *6180* (11); *Haber, W. & W. Zuchowski 10093* (11); ***Hadač, E.*** *599* (9), ***838*** (9); *Hahn, L. 168* (9), *373* (9), *724* (9); *Hahn, W. 301* (11); *Halsted, M. 8* (11); *Hamblett, R. 1449* (11); *Hamilton, C. et al. 955* (9); *Hamilton, S. 155* (11); *Hammel, B. E. 1086* (11), *1743* (11), *5286* (11), *7765* (11), *18513* (8), *21057* (8); *Hammel, B. E. & M. Garita 19312* (11); *Hammel, B. E. et al. 18508* (1), *18710* (1), *18851* (15), *19062* (9), *19684* (11); *Harley, R. M. 24721* (15), *24750* (11); *Harling, G. & L. Andersson 11975* (11), *14301* (11), *17808* (11); *Harmon, W. E. 2921* (9); *Harmon, W. E. & J. D. Dwyer 2912* (6), *3788* (6), *4348* (9); *Harmon, W. E. & J. A. Fuentes 2082* (10), *4687* (9); *Harris, W. 6841* (9), *7613* (9), *7618* (9), *8424* (9), *10024* (9); *Harrison, S. G. et al. 1330* (15); *Hart, J. 641* (9); *Hartman, C. V. 258* (13); *Hartman, R. L. 12015* (3), *12130* (11); *Hartweg, K. 647* (11); *Harvey, D. 5165* (11); *Hatheway, W. H. 1015* (11); *Havard, V. 3* (11); *Hawkins, T. 1156* (5); *Hayes, S. s.n.* [July 1860] (9), *51* (11), *122* (3), *316* (11), *777* (11), *794* (11), *920* (11), *977* (11); *Hazlett, D. L. 786* (9), *972* (9); *Heithaus, E. R. 370* (15); *Heller, A. 6104* (9); *Heriberto, B. 250* (11); *Heringer, E. 305* (11), *4257* (11); *Hernández, M. A. 627* (11); *Hernández G., H. 560* (9); *Hernández M., R. 4029* (9); *Hernández O., A. 128* (9); *Hernández Sandoval, L. 721* (9), *813* (9), *1615* (9), *1621* (9); *Hernández X., E. et al. ES-298* (9); *Herrera, H. 826* (11); *Herrera, H. & O. Guillen 656* (11); *Herrera P., C. 152* (11); *Hertel, H. et al. 35661* (11); *Heyde, E. T. & E. Lux 3707* (9), *4124* (9), *4127* (9); *Hilger, H. & A. J. Urquiola 99/14* (11); *Hill, S. 13450* (9); *Hinton, G. B. 1283* (9), *3888* (9), *4850* (9), *5139* (9), *6531* (2), *6723* (14), *7075* (9), *9615* (2); *Hinton, G. B. & J. C. Hinton 10926* (12), *11784* (9), *12248* (9), *12458* (9), *14087* (14), *14611* (13); *Holm, R. W. & H. H. Iltis 338* (8); *Holton, I. s.n.* [s.d.] (9); *Holway, E. 333* (11), *497* (9), *500* (11); *Hopkins, M. J. G. 776* (15); *Houck, D. 3283* (9), *3761* (9), *3827* (9), *3911* (11); *Houstoun, W. s.n.* [s.d.] (9); *Howard, J. & L. K. Johnson SR 81030* (11); *Howard, R. A. 6622* (11), *10402* (15), *10855* (9); *Howard, R. A. & E. S. Howard 8970* (9), *10257* (9); *Howard, R. A. & G. R. Proctor 13409* (9); *Huashikat, V. 1659* (1); *Huft, M. J. et al. 2259* (9); *Hunter, A. & P. H. Allen 99* (11), *702* (11).

Ibáñez García, A. & N. López 1585 (11); *Ibáñez García, A. et al. 1659* (11); ***Ibarra Manríquez, G.*** *6* (10), *30* (10), *30-a* (10), *421* (10), *461* (11), *1018* (11), ***1446*** (10); *Ibarra Manríquez, G. & S. Sinaca C. 1251* (10), *3084* (10), *3340* (10); *Ibarra Manríquez, G. et al. 5507* (10), *5546* (10); *Ibarra, R. et al. s.n. 2* [16 dic. 2007] (9); ***Idrobo, J. M. 2357*** (1); *Iltis, H. H. G-67* (9); *Irwin, H. 2641* (11), *14978* (11); *Irwin, H. et al. 17159* (15); *Izaguirre B., E. 140* (9).

Jack, J. 4389 (11), *4640* (11), *5360* (11), *5573* (11), *6896* (11), *8532* (9); *Jacobs, B. 2068* (8); ***Jacquin, N. s.n.*** [s.d.] (11); *Jameson, W. 342* (11); *Janish, C. & J. Janish 475* (9);

Jansen-Jacobs, M. J. 2649 (15); *Jansen-Jacobs, M. J. et al. 2376* (11), *3333* (11), *3452* (11), *3960* (15), *4469* (15), *5074* (15); *Janzen, D. H. 10120* (15), *12133* (15); *Jaramillo, N. et al. 1362* (1); *Játiva, C. & C. C. Epling 2196* (11); *Jean-Pierre, L. 51* (9); *Jiménez, J. 5179* (11); *Jiménez B., J. & R. Rodas 560* (9); *Jiménez L., O. s.n.* [16 dic. 1966] (15); *Jiménez M., A. 1315* (11), *1499* (11), *1561* (15), *3520* (11), *3633* (11); *Jirón, F. 25* (8); *Johansen, H. 19* (11); *Johnson, C. D. 1618-80* (9); *Johnson, C. D. & R. Conway 406-78* (5), *469-78* (9), *519-79* (9); *Johnson, D. s.n.* [18 June 1919] (9); *Johnson, H. 564* (11), *1194* (10); *Johnston, I. M. 514* (11), *619* (11), *906* (11), *1173* (11), *1597* (1); *Johnston, J. R. 571* (11), *1090* (11), *1258* (6); *Johnston, M. C. s.n.* [29 Nov. 1996] (9), *12856* (11); *Johnston, M. C. & J. Graham 4730* (9); *Jolis, A. et al. s.n.* [s.d.] (13); *Jones, R. & H. Jiménez-Saa 9906* (9), *10160* (1); *Jürgensen, C. 225* (13).

Kayap, R. 682 (11), *1237* (1), *1450* (11); *Kellerman, W. A. s.n.* [8 Mar. 1907] (10); *Kennedy, H. 2253* (11), *2279* (11), *2290* (11); *Kenoyer, L. s.n.* [24 Nov. 1937] (9), *920* (9); *Kerber, E. 73* (11), *172* (9); *Kernan, C. 858* (11); *Khan, R. et al. 176* (11), *1370* (9); *Killip, E. 43643* (11), *45268* (11); *King, K. & J. Chávez 83* (9); *King, R. M. & T. R. Soderstrom 4943* (14), *4979* (9); *Kirkbride, Jr., J. et al. 3946* (11); *Klug, G. 3592* (11), *4129* (11); *Knab-Vispo, C. 1248* (15); *Knapp, S. 3265* (11), *7990* (11); *Knapp, S. & P. W. Alcorn 7307* (11); ***Knapp, S. & J. Mallet*** *2980* (11), ***3218*** (3); *Knapp, S. & R. J. Schmalzel 3599* (11), *3624* (11); *Knapp, S. & K. J. Sytsma 2317* (11); *Knobloch, I. 526* (9); *Koelz, W. N. 34273* (13); *Kraker, C. 147* (11); *Krause, E. et al. 15300* (9); *Kriebel, R. 736* (8); *Krings, A. 71* (11), *75* (11); *Krukoff, B. 1113* (11); *Kruse, H. 114* (14), *1425* (9), *5570* (14), *19630323-135* (14), *19631128-134* (14); *Kú, F. & C. A. Yam 717* (9), *718* (9); *Kufer, J. 327* (11); *Kuhlmann, J. 2372* (11); *Kujikat, A. 343* (11); *Kuylen, H. E. "E"* (10).

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(9), *540* (9); *Monterrosa S., J. A. & R. A. Carballo 466* (9); *Moore, A. D. 1829* (11); *Moore, H. E. 5042* (11); *Mora C., E. 1790* (11); *Mora C., E. & E. Rojas 1410* (1); *Moraga, C. 424* (11), *924* (8); *Morales, J. F. 982* (11); *Morales Can, J. 1249* (9); *Morales R., J. 875* (9); *Moran, R. 19034* (13); *Moreno, P. P. 2458* (9), *2777* (9), *2806* (9), *2964* (9), *3004* (9), *3093* (9), *3715* (9), *3772* (11), *4157* (11), *4383* (12), *4749* (11), *4879* (9), *5029* (9), *5104* (11), *5345* (9), *5377* (9), *5610* (9), *5621* (9), *5672* (9), *5701* (9), *5769* (9), *5801* (9), *5876* (11), *5985* (11), *6728* (11), *6751* (9), *11711* (9), *11759* (9), *11763* (9), *12408* (8), *12469-a* (8), *13316* (9), *13836* (9), *13883* (9), *13909* (9), *14004* (9), *14424* (9), *14515* (9), *14861* (11), *17419A* (9), *18038* (9), *18436* (9), *18532* (9), *18590* (11), *18656* (9), *18662* (9), *18887* (11), *19351* (9), *20218-a* (11), *22251* (9), *22274* (9), *22427* (9), *22634* (9), *23090* (11), *23767* (11), *23817* (11), *24916* (11), *25033* (11), *26087* (8); *Moreno, P. P. & W. Robleto T. 20752* (11), *20859* (11), *20961* (9); *Moreno, P. P. & J. C. Sandino 6488* (12), *14969* (11), *15174* (11); *Moreno C., P. 198* (5), *462* (5), *525* (9); *Moreno M., F. 146* (11); *Mori, S. A. & A. Bolten 7106* (8); *Mori, S. A. & J. A. Kallunki 2005* (1), *3600* (11); *Mori, S. A. & R. O. Woodbury 17003* (9); *Morton, C. 4745-a* (9), *10246* (11), *10488* (11); *Morton, C. & A. Liogier 8820* (9); *Murillo, J. 104* (9).

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Padilla, G. 65 (9); *Padilla, S. 106* (11), *119* (11); *Padilla G., C. A. 73* (11); *Palacios, W. 3469* (1); *Palacios Espinosa, E. 1397* (11), *1978* (9); ***Palmer, E.*** *s.n.* [1890] (13), *18* (9), *42* (9), *103* (13), *157* (13), ***228*** (14), *323* (13), *675* (13), *676* (13), ***1491*** (13), ***1694*** (13), *1699* (9); *Panfet Valdés, C. et al. 71023* (11); *Parada, G. et al. 103* (11); *Paul (Bro.) 597* (11); *Pavon L., C. 146* (9), *148* (9), *187* (9); *Pearce, R. 2374* (13); *Peck, M. E. 233* (11), *621* (10), *621-a* (11); *Peláez F., S. 415* (9), *576* (9), *635* (11); *Peña-Chocarro, M. et al. 592* (9); *Perdomo, R. 246* (11); *Pérez, S. 52* (13); *Pérez G., E. A. 1799* (7); *Pérez G., E. A. & B. Reyes D. 1604* (7); *Pérez J., L. A. 288* (13); *Pérez J., L. A. et al. 313* (14); *Pérez Lara, M. A. 109* (9), *499* (9), *540* (9); *Perino, C. H. 3218* (9); *Perla, J. 82* (11); *Perret, C. et al. 76* (9); *Peterson, P. 6468* (11); *Peterson, P. & C. R. Annable 6627* (11), *6831* (11), *6933* (11); *Pickel, B. J. et al. 554* (15); *Pimentel B., J. & F. Jiménez 947* (9); *Piper, C. 5346* (11), *5397* (11), *5937* (11); *Pipoly, J. et al. 3660* (11), *3935* (11), *4235* (11), *4315* (11), *4442* (11), *4527* (11); *Pittier, H. 645* (11), *2133* (11), *4903* (11), *5561* (11), *9020* (15), *9800* (15), *12477* (15); ***Pohl, J. B. E. 731 (3107)*** (11); *Poiteau, P. s.n.* [1802] (9); *Polanco J., J. 82* (11); *Ponthieu, H. s.n.* [s.d.] (9), *Poppleton, J. & A. G. Shuey s.n.* [17 Dec. 1974] (9); *Porter, D. et al. 4992* (11); *Powell, D. 1024* (9); *Pozuelos, J. s.n.* [3 Dec. 1976] (9), *6596* (9); *Prado G., D. 49* (11), *173* (11); *Prado M., J. 84* (11), *207* (11); *Prado P., R. 5* (11); *Prance, G. T. 4447* (11); *Pringle, C. G. 3210* (9), *3375* (9); *Proctor, G. R. 8188* (9), *10988* (9), *16808* (11), *20081* (9), *20297* (9), *21942* (9), *22968* (9), *24225* (9), *27639* (9), *27640* (9), *29473* (11), *42584* (9); *Proctor, G. R. et al. 27299* (11); *Provance, M. C. 8166* (2); *Pruski, J. 3455* (15); *Puch T., A. 1429* (9), *1492* (9), *1512* (9); *Puig, H. 3749* (9); ***Purpus, C. A.*** *2274* (9), *2874* (11), *3172* (2), *4198* (2), *5407* (11), *6064* (9), *6498* (2), ***8032*** (9), *8052* (11), *9156* (9), *10820* (11), *10826* (11), *14226* (9), *15011* (11), *16802* (9).

Quentin, R. 1078 (9); *Quesada, F. A. 40* (15), *476* (8); *Quesada, F. J. 421* (11); *Questel, A. 688* (9), *851* (9), *1416* (9), *2373* (9), *4492* (9), *4587* (9); *Quevedo Sopepí, R. et al. 2562* (11); *Quiñones, L. M. et al. 15* (11); *Quintana, P. 64* (9); *Quirós C., M. 856* (15), *1450* (11).

Ramamoorthy, T. P. 1528 (9), *3382* (10); *Ramamoorthy, T. P. & A. Herrera 4168* (11); *Ramcharan, E. 132* (11); *Ramírez, F. & M. Cano FR1536* (11); *Ramírez, N. 624* (15), *649* (15), *2415* (15); *Ramírez, V. H. 236* (11); *Ramírez, V. H. & J. F. Morales 332* (8); *Ramírez B., A. 134* (9); *Ramírez D., R. 2939* (14); *Ramírez L., A. s.n. (MEXU 19832)* (13); *Ramírez R., R. & G. Flores F. 698* (13); *Ramos Á., C. H. & E. M. Martínez S. 2253* (10); *Ratter, J. A. 5499* (15); *Raunkiaer, C. s.n.* [Nov. 1905] (9), *s.n.* [8 May 1906] (9), *1166* (11); *Raven, P. H. 21503* (8); *Rehder, A. s.n.* [5 Feb. 1903] (9); *Reiche, K. 204* (9), *940* (9); *Reko, B. P. 3438* (11), *6113* (11), *6113-b* (11); *Renson, C. 69* (11); *Reyes-García, A. 2394* (11), *2824* (13); *Reyes-García, A. & G. Urquijo 890* (9); *Reyes-García, A. et al. 1579* (9), *4219-b* (11); *Reyes S., J. 1670* (2), *2072-a* (2); *Reyes de los Santos, E. 165* (9); *Richard, D. s.n.* [s.d.] (11); *Richardson, W. D. 998* (15); *Ricksecker, A. E. 50* (9); *Rico A., M. L. 1186* (9); *Ríos, D. E. 299* (11); *Ríos, P. 238* (11); *Rivas, R. 66* (9), *176* (9); *Rivera, G. 1366* (8), *1816* (11); *Robles, R. 1127* (8); *Robleto T., W. 175* (11), *273* (11), *1362* (11), *1564* (11); *Rodal, M. J. N. & J. Y. Tamashiro 617* (15); *Rodríguez, D. & A. Tejada 2133* (12); *Rodríguez, D. & J. Trejo 141* (9); *Rodríguez, E. A. 46* (15); *Rodriguez, L. 2566* (9); *Rodríguez, R. 38* (11); *Rodríguez, S. 41* (11); *Rodríguez G., A. 542* (8), *7460* (1); *Rodríguez G., A. & A. Estrada 221* (11); *Rodríguez G., A. et al. 1384* (15), *4141* (15); *Rohweder, O. 3627* (9); *Romaniuc N., S. & L. Rossi 1165* (11); *Rombouts, H. 662* (15); *Rondeau, R. 508* (15); *Rosa, N. A. & M. R. dos Santos 2120* (11); *Rosales, J. M. 80* (11), *673* (9), *1519* (9), *1551* (9), *1645* (12), *1857* (11), *2441* (12); *Rosas R., M. 1393* (11); *Rose, J. N. s.n.* [June 1897] (9); *Rose, J. N. et al. 3438* (9), *3606* (9), *4273* (11); *Ross, G. 10–58* (9); *Ross, H. 456* (2), *813* (9), *1123* (11); *Ross, R. SAN256* (9); *Rovirosa, J. 333* (9), *641* (11); *Rowlee, W. W. & H. E. Stork 688* (8), *719* (8); *Roy, J. M. 1* (11), *2* (11), *3* (11); *Rubio, D. 328* (1); *Rubio, D. et al. 1798* (11), *1862* (11); *Rubio, H. 1099* (11); *Rudolphi, I. K. A. s.n.* [1805] (11); *Rueda, R. M. 11988* (9), *12195* (9), *12592* (9), *12608* (9); *Rueda, R. M. & R. Dolmus 1186* (9); *Rueda, R. M. et al. 1585* (8), *1758* (8), *3083* (8), *3087* (11), *3187* (11), *4654* (8), *6279* (11), *10180* (11), *10440* (11), *15476* (11), *18394* (11); *Rugama, R. 44* (9), *73* (9); *Rugel, F. s.n.* [Feb. 1846] (9), *1* (9), *51* (11), *127* (9); *Ruíz Ríos, J. 111* (9); *Rzedowski, J. 14621* (13), *14772* (9), *17801* (9), *23348* (9), *24717* (9), *25497* (11), *33790* (9).

Sagra, R. et al. 103 (11), *399* (11); *Salas, S. et al. 37* (11); *Salas M., S. H. & E. M. Martínez S. 2136* (7); *Salas M., S. H. et al. 1510* (13), *1843* (7); *Salick, M. J. 8157* (11); *Salinas T., A. et al. 6865* (2); *Sánchez M., A. & A. Nava Zafra 274* (13), *513* (13); *Sanders, A. C. et al. 8335* (2), *8586* (2), *9309* (13), *10886* (2), *11778* (2), *11843* (2); *Sandino, J. C. 1904* (11), *1963* (9), *2055* (11), *2343* (11), *4096* (11), *5171* (11); *Sandino, J. C. & S. I. Martínez 3766* (11); *Sandoval, E. A. & F. Chinchilla P. 89* (11), *762* (9); *Sandoval, E. A. & A. Román 1445* (9); *Sandoval, M. 179* (9); *Sandwith, N. 1810* (11); *Santamaría Aguilar, D. & D. Solano 594* (11); *Santana M., F. J. 918* (13), *4071* (9); *Santana M., F. J. & N. Cervantes A. 645* (13), *1062* (2); *Sargent, F. B30* (9); *Sarukhán K., J. et al. 2518* (11), *2654* (11), *3126* (11), *3272* (11), *3503* (9), *3755* (11), *4342* (11); *Sastre, C. 8284* (9); *Sauleda, R. & D. K. Sauleda 8465* (9); *Sauleda, R. et al. 8451* (9); *Saunders, J. G. 873* (11), *1145* (11), *1214* (11); *Saynes V., A. 5209* (13), *5259* (13); *Saynes V., A. & A. Sánchez M. 3461* (7); *Schinini, A. & G. Caballero M. 27380* (11); *Schipp, W. A. 2* (11), *472* (11), *8–457* (10); *Schmalzel, R. J. 321* (11), *374* (11), *1844* (9); *Schmalzel, R. J. & T. M. Aide 106* (3); *Schmalzel, R. J. & T. Jacobs 245* (11); ***Schomburgk, R. H. 584*** (11), ***711*** (11), ***747*** (15); *Schott, A. 658-a* (9), *668* (9), *711* (9); *Schubert, B. G. & A. Gómez Pompa 1632* (5); *Schubert, B. G. & H. F. Winters 444* (9); *Schultz, G. & R. A. Palestina 1081* (5); *Schunke V., J. 5637* (11), *8474* (1), *8483* (1), *9563* (11); *Schwabe, W. s.n.* [Aug. 1959] (15), *s.n.* [Dez. 1964] (11), *s.n.* [Jan. 1973] (11), *216* (11); *Schwabe, W. & W. Kailing s.n.* [17 Dec. 1978] (9); *Seemann, B. s.n.* [Feb.–Mar. 1849] (9), *20* (11), *335* (11), *1647* (9); *Seibert, R. J. 1231* (9); *Seler, C. & E. G. Seler 3277* (9); *Servín O., B. 1225* (9), *1348* (9), *1459* (9); ***Sessé, M. et al.*** *s.n.* [s.d.] (11), *3806* (11), ***5202*** (11), *5202-b* (9); *Seymour, F. C. 2762* (11), *5075* (11); *Shafer, J. A. 60* (11), *321* (9), *657* (9), *916* (9), *1161* (9), *2356* (9), *2860* (9), *2892* (9), *10465* (11); *Shank, P. & A. Molina R. 4923* (11); *Shapiro, G. 282* (13); *Sharp, A. J. 441848* (9); *Shattuck, O. E. 290* (3), *444* (3), *523* (3), *744* (11), *814* (11); *Shimek, B. & C. L. Smith s.n.* [s.d.] (11); *Sidwell, K. J. et al. 720* (9), *841* (9); *Sieber, F. 86* (9), *309* (9); *Siles G., E. L. 18* (9); *Silva, M. & R. P. Bahia 3494* (11); *Silva, M. & C. S. Rosário 5427* (15); *Silverstone-Sopkin, P. 7784* (11); *Simá, P. 358* (5), *1490* (9), *2205* (9); *Simpson, J. 406* (9); *Sinaca C., S. 1357* (10), *2358* (9), *2365* (9); *Sinaca C., S. & G. Ibarra Manríquez 322* (11); ***Sintenis, P.*** *36* (11), *36-b* (9), *200* (9), *200-b* (9), *1261* (9), ***1960*** (9), ***2211*** (9), *2307* (9), *2924* (9), *3566* (11), *5307* (9), *5508* (9), *5547* (11), *5550* (9); *Skutch, A. F. 1446* (9), *1502* (11), *1796* (11), *2093* (11), *2267* (9), *2748* (9); *Slane, V. 352* (9); *Small, J. K. 2182* (9), *2775* (9); *Small, J. K. & J. J. Carter 505* (9), *993* (9); *Small, J. K. & E. W. Small 5015* (9); *Small, J. K. & G. K. Small 4533* (9), *4629* (9); ***Smith, A.*** *A346* (9), ***F1952*** (8), *P2198* (9), *P2354* (11), *2354* (11), *2835* (9); *Smith, A. C. 3083* (15), *3434* (11); *Smith, D. A. 251* (8), *1091* (8); *Smith, D. N. 3652* (11); *Smith, D. N. et al. 13624* (11); *Smith, H. H. 1943* (11); *Smith, H. H. & G. W. Smith 1302* (11), *1302-a* (11); *Smith, R. 2186* (11); *Soejarto, D. D. et al. 7237* (12); *Solís M., J. A. 3143* (13), *4138* (13); *Solís Rojas, F. 581(–8)* (11); *Soto N., J. C. 75* (13), *275* (13), *11696* (13); *Soto N., J. C. & E. M. Martínez S. 5906* (13), *6024* (9); *Soto N., J. C. et al. 5972* (13), *11342* (13), *13214* (9), *13334* (11), *13493* (9); *Soule, O. 2255* (9); *Sousa S., M. 10* (9), *147* (11), *1010* (9), *1359* (11), *1515* (11), *1711* (11), *1715* (9), *2657* (11); *Sousa S., M. & C. H. Ramos Á. 4792* (9); *Sousa S., M. et al. 10831* (5), *10965* (5); *Soza, D. et al. 362* (11), *429* (11); *Sparre, B. 13006* (11); *Sperry, J. 742* (8); *Spruce, R. 1548* (11); ***Stahl, A. 782*** (9); ***Standley, P. C.*** *1688* (9), *8386* (11), *8769* (9), *8927* (11), *16390* (11), *17536* (9), *18215* (11), *19133* (9), *19890* (11), *20305* (11), *20691* (9), *20776* (9), *22536* (11), *22547* (11), *24522* (11), *24595* (11), *24872* (11), *24983* (11), *25398* (11), *25531* (11), *26557* (11), *27051* (11), *27145-a* (9), *27486* (1), *27595* (1), *27906* (11), *28962* (11), *29202* (11), *29623* (11), *30249* (11), *31417* (1), *31604* (11), *31999* (11), *32137* (11), *36047* (11), *52753* (11), *53753* (11), *54531* (11), ***54988*** (5), *55062* (9), *59676* (9), *59894* (6), *60459* (11), *61408* (9), *62079* (9), *63394* (9), *64031* (11), *64943* (11), *66703* (9), *72684* (10), *72803* (11), *74855* (9), *76326* (9), *76521* (9), *77702* (9), *77846* (11), *78286* (11), *78671* (9), *78706* (11), *78833* (9), *79208* (9), *79217* (9), *79369* (11), *79632* (11), *79680* (9), *88245* (9), *88780* (9), *91084* (6); *Standley, P. C. & J. Chacón P. 6942* (9); *Standley, P. C. & E. Padilla V. 1932* (11); *Standley, P. C. & J. Valerio R. 43407* (9), *46354* (11), *48352* (11); *Stanford, L. R. et al. 993* (9); *Stehlé, H. s.n.* [25 Feb. 1963] (9), *313* (9), *1402* (9), *1711* (9), *1950* (9); *Stehlé, H. & M. Stehlé 4840* (9), *5424* (9), *5954* (9); *Steinbach G., J. 9351* (11); *Stergios, B. 1781* (11), *3987* (11), *5125* (11), *5271* (11); *Stergios, B. & G. Aymard 6444* (15); *Stergios, B. et al. 5168* (15); *Stern, W. L. et al. 625* (11), *1715* (11); *Stevens, G. 5* (11); *Stevens, W. D. 4496* (9), *5151* (9), *5824* (11), *5893-b* (9), *6030* (9), *6358* (11), *7177* (11), *7361* (11), *7943* (9), *10246* (9), *11961* (11), *12190* (11), *12288* (11), *12410* (11), *12575* (11), *12908* (11), *18648* (11), *18766* (11), *23529* (11), *29001* (11), *32379* (9), *32389* (9), *32391* (11), *32644* (11); *Stevens, W. D. & E. Duarte M. 28118* (11), *28962* (11), *29132* (11); *Stevens, W. D. & M. Fairhurst 2047* (13); *Stevens, W. D. & A. Grijalva P. 15100* (11), *15405* (11), *15700* (9), *16056* (9); *Stevens, W. D. & E. M. Martínez S. 25745* (9); *Stevens, W. D. & O. M. Montiel J. 18513* (9), *26541* (11), *27469* (11), *27542* (11), *27790* (11), *27827* (11), *27835* (11), *27867* (11), *27883* (11), *28027* (9), *28029* (9), *28061* (9), *28065* (11), *29214* (11), *30377* (11), *30408* (11), *30518* (9), *30532* (11), *30580* (11), *30729* (11), *30842* (11), *31877* (9), *32752* (11), *33195* (12); *Stevens, W. D. & P. P. Moreno 19216* (11), *19496* (11), *19662* (11); *Stevens, W. D. et al. 16718* (11), *21322* (11), *21354* (9), *21505* (11), *29254* (11), *30160* (9); *Stevenson, J. et al. 385* (9), *697* (9), *2403* (9), *2503* (9); *Steyermark, J. A. 29499* (9), *33807* (9), *37575* (11), *44256* (11), *50718* (9), *51575* (9), *106924* (11), *129298* (11); *Steyermark, J. A. & A. C. González 113698* (11); *Steyermark, J. A. et al. 123599* (11); *Stork, H. E. 34* (8); *Straw, R. & M. Forman 1834* (13); *Suazo, N. 58* (11); *Suazo, S. 2469* (11).

Tamayo, F. 3319 (11); *Tate, R. 61(–216)* (11); *Taylor, N. 145* (11), *353* (11), *446* (9); *Taylor, R. 17362* (11); *Tejada, R. 90* (9); *Téllez V., O. 11283* (12), *11321* (9); *Téllez V., O. & E. F. Cabrera C. 3769* (9); *Téllez V., O. & F. Chiang C. 9718* (14), *Téllez V., O. & R. J. Pankhurst 7181* (9); *Téllez V., O. & A. Salinas T. 11919* (14), *11945* (13); *Téllez V., O. et al. 4257* (11); *Tenorio L., P. & G. Flores F. 16270* (13), *16301* (9); *Tenorio L., P. & C. Romero de T. 2481* (11); *Tenorio L., P. & R. Torres C. 5262* (9); *Tenorio L., P. et al. 2815* (13), *2873* (9), *3084* (9), *6959* (2), *10431* (13), *10489* (13), *10495* (13), *10497* (13), *12639* (11); *Terry, M. & R. A. Terry 1378* (11), *1384* (11); *Tessmann, G. 4533* (1), *4682* (1); *Thieme, C. 5181* (9), *5629* (9), *5508 (624)* (11); *Thomas, J. 7877* (13); *Thomas, W. 2065* (9); *Thompson, J. 455* (9); *Toledo, M. et al. 683* (11); *Tonduz, A. 839* (9), *11509* (11), *12807* (11), *13660* (11), *13661* (15), *13786* (9); *Torrecillas N., E. 72* (9); *Torres, S. & L. Serralta 515* (5); *Torres B., E. 2297* (2), *2423* (2); ***Torres C., M. L. et al. 134*** (7), *180* (7), *238* (7), *580* (7), *689* (7); *Torres C., R. 4170* (12); *Torres C., R. & E. F. Cabrera C. 6195* (15); *Torres C., R. & C. Martínez R. 5739* (7); *Torres C., R. et al. 2539* (10), *3560* (9); *Trejo, I. 2250* (9), *2524* (13), *2693* (13); *Triana, J. 2537* (11), *5746/2-b* (15); *Tun, J. 342* (9); *Türckheim, H. II 194* (11), *2580* (9), *2585* (11), *7734* (11), *8503* (9), *8503-b* (11); *Turner, R. 59–141* (13); *Tyson, E. L. 891* (9), *2674* (11), *2733* (11), *3517* (11), *3873* (11); *Tyson, E.*

L. & K. E. Blum 2590 (11); *Tyson, E. L. & R. L. Lazor 6156* (11); *Tyson, E. L. & H. Loftin 5083* (11); *Tyson, E. L. et al. 3138* (11), *4519* (1).

Ucán Ek, E. et al. 6466 (5); *Urbina, E. 158* (11); *Urbina H., L. 93* (11); *Utley, J. F. & K. Utley 5138* (8).

Valerio, M(anuel) 448 (11), *1480* (11); *Valerio, M(arlon) 79* (9); *Valerio R., J. 890* (9), *894* (9), *945* (9), *1137* (9), *1293* (9), *1539* (9), *1626* (9), *2976* (9); *Valeur, E. J. 251* (11), *268* (9); *Valle Doménech, A. 162* (11); *Vallejo, E. 70* (9); *Valverde, Ó. et al. 83* (8); *Valverde R., J. L. 160* (13); *van der Werff, H. & R. E. Ortíz 5431* (15); *van der Werff, H. et al. 16352* (1); *Van Devender, T. R. et al. 92–1039* (13), *98–2115* (13); *Van Hermann, H. A. 21* (11), *21-b* (11); *Vanni, R. O. et al. 2765* (11); *Varela, J. 35* (11); *Vargas, O. 464* (8), *1790* (8); *Vásquez, R. et al. 18917* (11), *19549* (1), *21775* (1), *24008* (11); *Vásquez B., F. & S. Avendaño R. 1491* (11); *Vásquez T., V. 519* (9); *Vaughan, J. E. et al.* 750 (15); *Vázquez, M. 573* (10); *Vázquez, M. et al. 16* (10), *1269* (11), *1672* (11); *Vázquez S., J. 1814* (9), *2014* (9), *2603* (9); *Vázquez V., L. 1462* (2), *1610* (2); *Vázquez V., L. & B. L. Phillips 604* (2), *820* (2), *911* (2); *Vega A., R. 1253* (13), *3576* (9); *Vega A., R. et al. 2466* (13), *3294* (13); *Vela, O. 1121* (9); *Velásquez, R. 1909* (11); *Vélez, I. 379* (9), *412* (9); ***Véliz Pérez, M.*** *14159* (6), ***92.2280*** (6), *94.4037* (6), *95.4394* (11); *Ventura A., F. 2695* (9), *2745* (9), *4555* (11), *6086* (9), *9320* (9), *10608* (9), *11747* (9), *11829* (9), *11958* (11), *12379* (11), *12420* (10), *13416* (9), *13619* (11), *15039* (10), *15484* (11), *15696* (10), *18141* (10), *19138* (9), *20730* (11), *20748* (11), *20865* (9), *21396* (9); *Ventura V., E. 411* (11); *Ventura V., E. & E. López 441* (9), *594* (9), *630* (9), *734* (9), *2620* (9), *2809* (11), *4793* (9); *Vera S., J. 2586* (11), *2610* (9), *2750* (9); *Vigueras G., L. et al. 60* (2); *Villa C., J. 347* (2); *Villa C., J et al. 872* (2); *Villa Muñoz, G. et al. 1244* (1), *1245* (1); *Villacorta M., R. 616* (9), *642* (9), *669* (11); *Villacorta M., R. & J. España 2298* (9); *Villanueva, R. 522* (5); *Villarreal, L. M. 7141* (14); *Vincelli, P. C. 196* (11), *200* (11); *Vincent, M. & F. Farruggia 10921* (11); *von Wedel, H. 1834* (11), *1850* (11), *1898* (11), *2045* (11).

Waby, J. et al. 48 (9); *Wagenbreth, I. 775* (9); *Wagner, M. s.n.* [Jan. 1858] (11); *Wagner, R. 928* (9); *Walker, R. 1380* (11); *Wallnöfer, B. 9483* (5), *9540* (5); *Warming, J. s.n.* [23 Sep. 1877] (11), *655* (11); *Warrior, W. 2325* (5); *Watson, S. 45* (11); *Webster, G. L. 22835* (11); *Webster, G. L. & W. S. Armbruster 21075* (2); *Webster, G. L. & G. J. Breckon 15649* (13), *15654* (13), *15662* (9); *Webster, G. L. & R. L. Dressler 16722* (8); *Webster, G. L. et al. 12211* (8), *13056* (2); *Welch, D. et al. 119* (11); *Wendt, T. L. & H. Hernández G. 5635* (10); *Wendt, T. L. et al. 2851* (9), *3498* (11); *Wessels Boer, J. 1298* (15); *Wetmore, R. & E. C. Abbe 48* (11), *67* (11); *Wetter, M. et al. 2084* (9); *White, P. & G. White 53* (11); *White, S. & W. S. Alverson 410* (11); *Whitefoord, C. 4666* (9), *5202* (9), *5832* (9), *10107* (11); *Whitefoord, C. & A. Eddy 209* (3); *Wiggins, I. L. 7350* (13), *14702* (13), *15388* (13); *Wiggins, I. L. et al. 500* (13); *Wilbur, R. L. & F. Almeda 16620* (8), *16664* (8); *Wilbur, R. L. & G. Moore 70292* (11); *Wilbur, R. L. & J. A. Teeri 13408* (11); *Wilbur, R. L. et al. 12907* (11), *13578* (11); *Williams, L. 8451* (10); *Williams, L. O. 18768* (11), *26579* (11); *Williams, L. O. & A. Molina R. 10573* (9), *10633* (9), *13425* (9); *Williams, L. O. & T. P. Williams 18471* (9), *18809* (9); *Williams, L. O. et al. 24006* (9), *24201* (11), *27391* (9), *28369* (11), *41297* (11); *Williams, R. S. 11* (11), *723* (1); *Wilson, C. 42* (11), *75* (11); *Wilson, N. s.n.* [s.d.] (9); *Wilson, P. 529* (11), *1217* (11), *1316* (11), *8212* (9), *9450* (9), *11375* (11); *Wilson-Browne, G. 101* (15); *Wood, J. 14752* (11); *Woodbury, R. O. s.n.* [16 Mar. 1956] (11), *s.n.* [29 July 1959] (9), *s.n.* [9 Nov. 1963] (11), *WI-72* (9); *Woodbury, R. O. et al. s.n.* [26 July 1979] (11); *Woodworth, R. H. 69* (9); *Woodworth, R. H. & P. A. Vestal 326* (3), *351* (11); *Woronow, G. J. N. & S. V. Juzepczuk 1249* (11); *Worthington, R. 24038* (11); *Woytkowski, F. 397* (11), *5557* (11), *6195* (1), *6510* (11); *Wright, C. 2* (9), *75* (11), *75?* (9), 3513 (9); *Wright, C. et al. 155* (9), *156* (11); ***Wright, W. s.n.*** [s.d.] (9); *Wullschlaegel, H. 105* (9); *Wunderlin, R. P. et al. 8309* (9).

Xavier, F. s.n. [10 juin 1896] (11).

Yánez, M. 554 (9); *Yuncker, T. G. 17310* (9), *17749* (9).

Zak, V. 4177 (1); *Zamora C., P. 4830* (9), *4882* (9); *Zanoni, T. A. & M. M. Mejía 17820* (11), *31921* (9); *Zanoni, T. A. & J. Pimentel B. 25510* (9), *27941* (11), *42845* (11); *Zanoni, T. A. et al. 10737* (9), *18116* (9), *18969* (9), *24039* (9), *24703* (9), *27650* (9), *28674* (11), *32065* (9), *35923* (11), *35924* (9); *Zardini, E. M. & A. Florentín 40052* (11); *Zelaya, L. 97* (9), *234* (9); *Zepeda G., C. 279* (9); *Zúñiga, R. 36* (11), *513* (11).